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INFORMAL REPORT

WORLD ATLAS OF COASTAL BIOLOGICAL FOULING PART I NORTH AMERICA, SOUTH AMERICA, ICELAND AND GREENLAND

SEPTEMBER 1970

NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON, D. C. 20390

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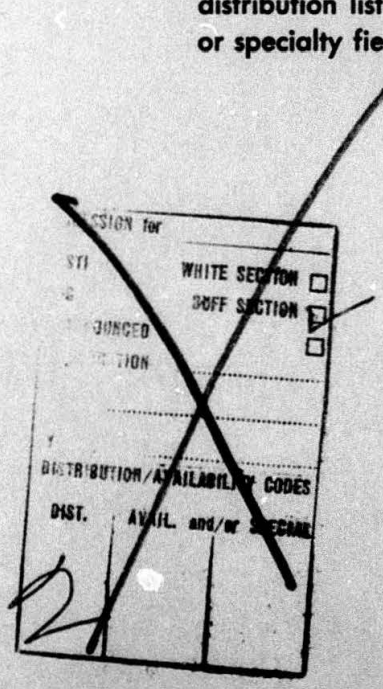

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13 ABSTRACT

This atlas is the first of a three part series, and is a comparison of available biofouling data covering the coastal areas of North and South America, Iceland and southern Greenland. The report contains 17 regional charts and a world reference chart. Specific biofouling locations, general areas, and severity are indicated on the regional charts, and the chart entries are cross-referenced in an index section according to chart/country, country/area, numerical and alphabetical notations.

A fouling severity key correlates word designations of severity with wet weight ($kg./m^2$) in air values, and chart symbolization. Ten major groups of organisms are represented on a series of data sheets corresponding to regional charts and the index section. The organisms are algae, amphipods, anemones, barnacles, bryozoans, hybroids, molluscs, sponges, tubeworms and tunicates. Information concerning these organisms are month(s) of maximum attachment, relative abundance, and other pertinent data including generic names. Predictions of fouling severity are made where sufficient data warrants such forecasting. An extensive references section concludes the report.

Eventual computerization of biofouling information into a "live" atlas is intended through the basic design of the atlas format and data presentation.

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	ROLE	WT	ROLE	WT	ROLE	WT
COASTAL						
FOULING						
NORTH AMERICA						
SOUTH AMERICA						
ICELAND						
GREENLAND						
FOULING INTENSITY						
FOULING ORGANISMS						
ATLAS						

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DATE: 1 September 1970

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PREFACE

Part I of the World Atlas of Coastal Biological Fouling is presented with the user in mind. The atlas format is intended to be open ended so that information can be added, or deleted, by the user without upsetting the system of presentation. As a result, this publication can be construed as a "live" atlas, and consequently a source document which hopefully will be updated on a continuous basis to provide the most reliable information available. Eventual computerization of biofouling information into a "live" atlas is intended through the basic design of the atlas format and data presentation.

As a prototype, the atlas has inherent shortcomings, many of which can be rectified through constructive suggestions, and updating of information. Persons or groups interested in the increasingly important field of biological fouling are requested to contribute usable atlas information to this Office.

ACKNOWLEDGEMENTS

Defining the scope of this source document, and the fusing of diverse data into a comprehensive format has been a difficult, but rewarding task. Numerous problems arose during development of the atlas, and at times, these problems seemed insurmountable. In due course these problems were overcome, but only with the help of the following people.

Recognition is accorded to M. Burkhardt, H. Weston, and F. M. Daugherty, Jr. for their initial work towards the atlas concept. Acknowledgements are extended to J. Lackie, R. Tittle, M. Beeston, S. Arny, and J. Jesswein for their specialized contributions.

Special acknowledgement is extended to W. Glidden and L. Fisher for their constructive criticisms, and developmental suggestions on all facets of the atlas.

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ATLAS ABBREVIATIONS

Ab., Abundant
Ala., Alabama
Alas., Alaska
Alg., Algae
Apr., April
Arg., Argentina
Att., Attachment
Aug., August

Bah., Bahama(s)
Barns., Barnacles
Berm., Bermuda
Braz., Brazil
Brys., Bryozoans

Calc., Calcareous
Calif., California
Can., Canada
Col., Colonial
Conn., Connecticut

Dec., December
Del., Delaware
Dom., Dominated, Dominant

E, Encrusting
E., East(ern)
Echins., Echinoderms
Ecua., Ecuador

F., Filamentous
Feb., February
Fla., Florida
Ft., Fort, Feet

G., Gulf
Ga., Georgia
Gasts., Gastropods
Grl., Greenland

Hbr., Harbor
Hyds., Hydroides

Ice., Iceland
Incl., Include(s)
Is., Island(s)

Jan., January
Jam., Jamaica

L, Light
La., Louisiana
Lat., Latitude
LM, Light to Moderate
Loc., Location
Long., Longitude

M., Meter(s)
M, Moderate
M.A., Maximum Attachment
Mass., Massachusetts
Mar., March
Md., Maryland
Me., Maine
Mi., Mile(s)
Miss., Mississippi
Mols., Molluscs
MS, Moderate to Severe
Mt., Mountain(s)
Muss., Mussels

N., North(ern)
N.C., North Carolina
N.E., Northeast
Newf., Newfoundland
N.H., New Hampshire
N.J., New Jersey
Nov., November
Nudis., Nudibranchs
N.W., Northwest
N.Y., New York

Oct., October
Op., Operating
Ore., Oregon

P., Presence
Pa., Pennsylvania
Pan., Panama
Pels., Pelecypods
Pen., Peninsula
P.R., Puerto Rico
Pred., Predicted

Rel., Relative
R.I., Rhode Island

S, Severe
S., South
S.C., South Carolina
S.E., Southeast
Sep., September
So., South
Sol., Solitary
Sp., Species
St., Saint(e)
Str., Strait
S.W., Southwest

T, Trace
Terr., Territory
Tex., Texas
TL, Trace to Light
Tubes., Tubeworms
Tuns., Tunicates

U.K., United Kingdom
Uru., Uruguay
U.S., United States
U.S.N., United States Navy
U.S.S.R., Union of Soviet Socialists Republics

Va., Virginia
VS, Very Severe

W., West(ern)
Wash., Washington

Yr., Year

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INTRODUCTION

Purpose

The purpose of this atlas is to present a consolidated, readily available, easy to use source of world wide coastal biological fouling conditions to users and researchers alike. In addition, an attempt is made to define those organisms which significantly contribute to biological fouling, their substrate attachment time periods, and their abundance relative to the total fouling community within a given geographical area. The atlas is also intended to serve as a continuous biofouling prediction mechanism for those coastal areas where fouling data are either sparse or absent.

Geographic Areas

When completed, the atlas will be comprised of three major parts, each of which will constitute a separate, but interrelated volume. Each part depicts continuous coastal areas of the globe, and each part is subdivided into smaller geographical sections defined as regional charts.

Part I of the atlas contains 17 regional charts (1-17) as illustrated in the World Reference Chart (Chart 18). The regional charts cover the coastal areas of North and South America, Iceland and southern Greenland.

Part II will tentatively contain coastal areas of Africa, the Indian Ocean and Mediterranean Sea, Europe, the northern reaches of Asia, and associated islands of the Atlantic Ocean.

Part III will provisionally contain the following coastal areas: East and Southeast Asia, Australia, New Zealand, and source data islands of the Pacific Ocean.

Previous Studies

Numerous examples of group and individual research reports have dealt with a wide range of biological foulers; their ofttimes polluted locales;

their interrelationships within and outside the marine fouling community; their problematic effects on man made and natural underwater structures, and so on. Historical and present studies, as well as those to follow, will continue to be of increasing importance as long as man continues to explore and utilize the marine environment.

The list of diversified fouling studies is seemingly endless, and the data presented is voluminous, as well as varied, both in reporting techniques and methodology. For these reasons, a historical treatise on the subject will not be attempted.

The Selected References section located at the end of this atlas is but a small cross-section of available reports and papers. Consequently, the references should not be construed as all encompassing.

DATA PRESENTATION

Sources, Analysis, Severity

Data presented for specific locations are extrapolations from original sources. In all cases where two or more data sources were obtained for a particular location, the information was analyzed collectively and correlated to produce a singular trend.

Past presentations of original data have taken various forms of expression. A popular form of indicating fouling severity makes use of word designations. Some notations of this type are light, heavy, medium, severe, and so forth. Another popular method of data expression is in terms of the wet and/or dry weight of the fouling organisms per unit area. This method of data presentation is numerical and the unit of measurement is either english, metric, or a combination of both. The Fouling Severity Key (Table I), presented for the first time, combines aspects of the two popular methods, and has been used for extrapolation of source data used in this atlas. Although arbitrary, the key will hopefully provide a meaningful and useful standard for reporting biological fouling information.

FOULING SEVERITY KEY

DESIGNATION	LETTER SYMBOL	MAP SYMBOL	WET WT. IN AIR $kg./m^2$
PRESENCE	P	NONE	NONE
TRACE	T	●●●●●●●	<5.00
TRACE TO LIGHT	TL	o·o·o·o·o	5.01–10.00
LIGHT	L	.....	10.01–15.00
LIGHT TO MODERATE	LM	—·—·—·—	15.01–25.00
MODERATE	M	———	25.01–35.00
MODERATE TO SEVERE	MS	XXXXXXX	35.01–45.00
SEVERE	S	———	45.01–55.00
VERY SEVERE	VS	ΔΔΔΔΔΔ	>55.01

Table I: FOULING SEVERITY KEY

Two basic types of data error may be included in the atlas. Some errors are inherent in the original study, whereas others may originate through extrapolation and transfer of source data for atlas presentation.

Prediction

Predictions of fouling severity and larval attachment periods are based on analog methods of forecasting. Predictions have been made from examination and correlation of physical environmental data, and biofouling trends adjacent to, and including, the specific area of interest.

Abbreviations

Abbreviations are extensively used to provide a more compact source of available information. A majority of the abbreviations utilized follow accepted usage, whereas others have been innovated for ease and convenience.

Data Sheets

The columnar format of the data sheet is designed to offer the user fouling information at a glance. Key numbers and abbreviations are exployed as mechanisms for presentation of consolidated information, cross-referencing purposes, and possible analog studies.

A representative data sheet (Table II) is illustrated below, and explanation of headings and associated information entries follows.

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS – MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES	
5	10	4			3	2	1					M

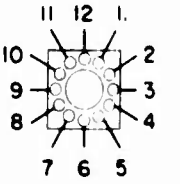
ADDITIONAL INFORMATION		
1 - JAN	7 - JUL	
2 - FEB	8 - AUG	
3 - MAR	9 - SEP	
4 - APR	10 - OCT	
5 - MAY	11 - NOV	
6 - JUN	12 - DEC	
E & F BRYS., RED (M.A. 6-8) & GREEN (M.A. 3-5) ALG., ACORN BARNS		

Table II: DATA SHEET EXAMPLE

1. Proceeding from left to right, the number 5 in the CHART NUMBER column refers to regional chart number 5, which depicts a section of the eastern coast of the United States.

2. The number 10, under the column labled LOCATION NUMBER, refers to a specific location on chart number 5. In this case, 5-10 is the number designation for the Block Island area of the state of Rhode Island. A letter notation (A, B, C, etc.) under this column heading denotes a general, rather than specific area. Specific location numbers and letters also appear on the regional charts for correlation with data sheet entries.

3. The FOULING ORGANISMS column contains a list of those organisms which are considered to be somewhat cosmopolitan in their distribution. The scope of this atlas necessitates exclusion of other fouling organisms, such as bacteria, for lack of available information relating to a given fouling community.

Under each group of fouling organisms are "daisy" configurations which constitute the format for presentation of months of maximum attachment (M. A.), relative abundance, and presence (P) data. The small circles within the daisy represent, in clock fashion, months of the year. A key to the daisy is located under the ADDITIONAL INFORMATION column. If blackened, these circles denote months of maximum attachment for the particular fouling organism. For example, location 5-10 under the heading of barnacles reads maximum attachment during the months of March, April, and May. Designations of months of M. A. are either predicted or directly taken from the literature. Predictions are so noted in the ADDITIONAL INFORMATION column. In essence, all M. A. notations are subject to change with possible changes in the organism's environment, and updated information.

Information within the large circle of the daisy is as follows: a number designation indicates relative abundance of that particular organism to other fouling organisms occupying the same location. The number 1 indicates most abundant, whereas the number 2 refers to the second most abundant, and so on. Entry of the letter P denotes only presence of the organism, and does not carry relative abundance significance.

4. Notations in the SILT COVER column pertain to relative deposition of silt upon the fouling community. Silting data is reported directly as taken from the literature.

5. The ADDITIONAL INFORMATION column contains supplementary data regarding the fouling organisms and their location. Translation of the exampled information is as follows: both encrusting and filamentous

bryozoans are present; algae is represented by the reds, which have a maximum attachment from March to May; the barnacles are "acorn" in type. Dates contained in the data sheets are expressed numerically. For example, 6 December 1944 is expressed as 6.12.44.

Charts

The atlas contains 17 sequentially numbered regional charts and one world chart. The latter defines boundaries of the regional charts, and is therefore an overall reference to the regional areas. Boundary overlap occurs only between charts 3 and 4, and between 7 and 8. All other chart boundaries adjoin one another.

Significant chart data includes country names, regional and specific location numbers, as well as continuous symbolization depicting fouling severity. Positions of severity symbols on the charts bear no relationship to seaward extent of biofouling.

Chart/Country Index (II)

Countries appearing on each chart are listed according to sequential chart numbers, 1 through 17, followed by their respective names in alphabetical order.

Country/Area Index (III)

This index alphabetically identifies specific areas within each country listed. These locations are further identified according to a number sequence as illustrated by the following example.

CANADA, Charts 3, 4, 15
Argentia, Newf., 4-12

The above designation means that Canadian coastlines appear on regional charts 3, 4, and 15. The 4-12 sequence specifies that Argentia, Newfoundland appears on regional chart 4, location number 12 on that particular chart.

Numerical Index (IV)

Specific fouling locations are listed according to a numerical sequence in association with regional chart numbers. The location number is followed by the name of the location or area, then state and country as in the following example.

CHART 6
1. Tampa, Fla., U. S.

Alphabetical Index (V)

Names of specific locations and areas are indexed alphabetically. The names are followed by the state, if any, and country of origin; then by a cross-referencing number sequence in accordance with all other indices. In the following example, the sequence 16-4 indicates that Adak Island has location number 4 on Chart 16.

Adak Is., Alas., U. S., 16-4

REGIONAL CHARTS

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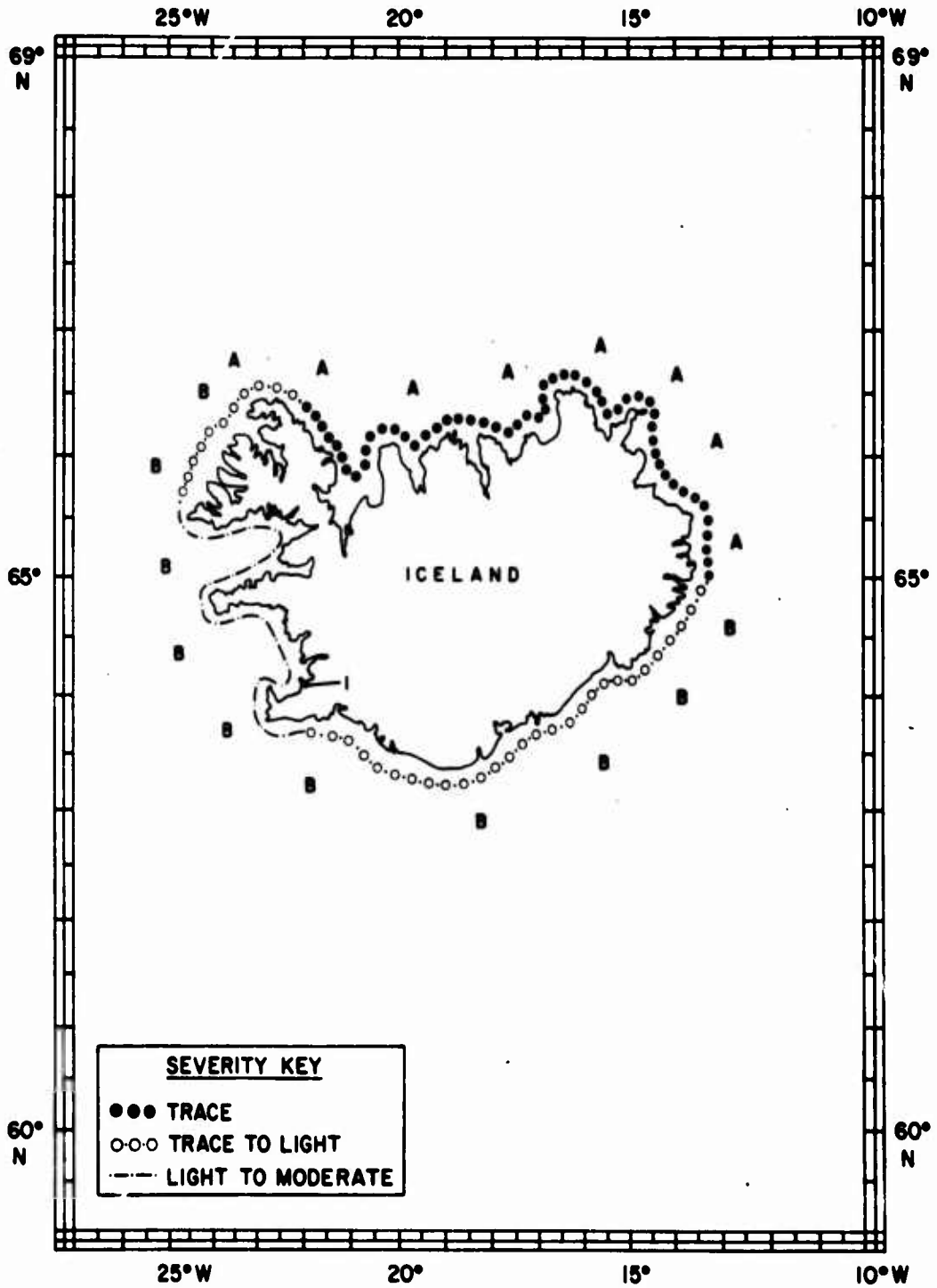

CHART 1 - ICELAND

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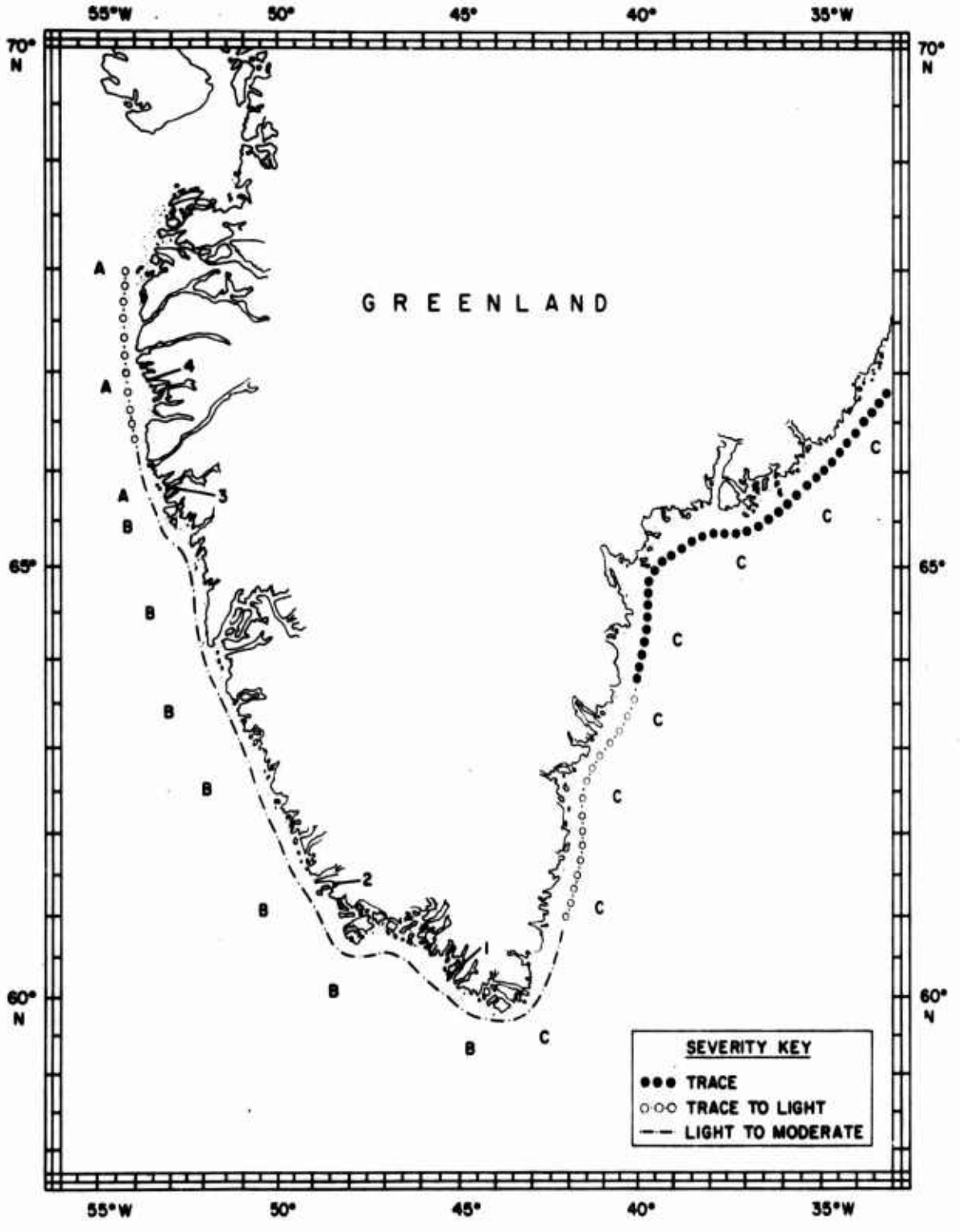

CHART 2 - S. GREENLAND

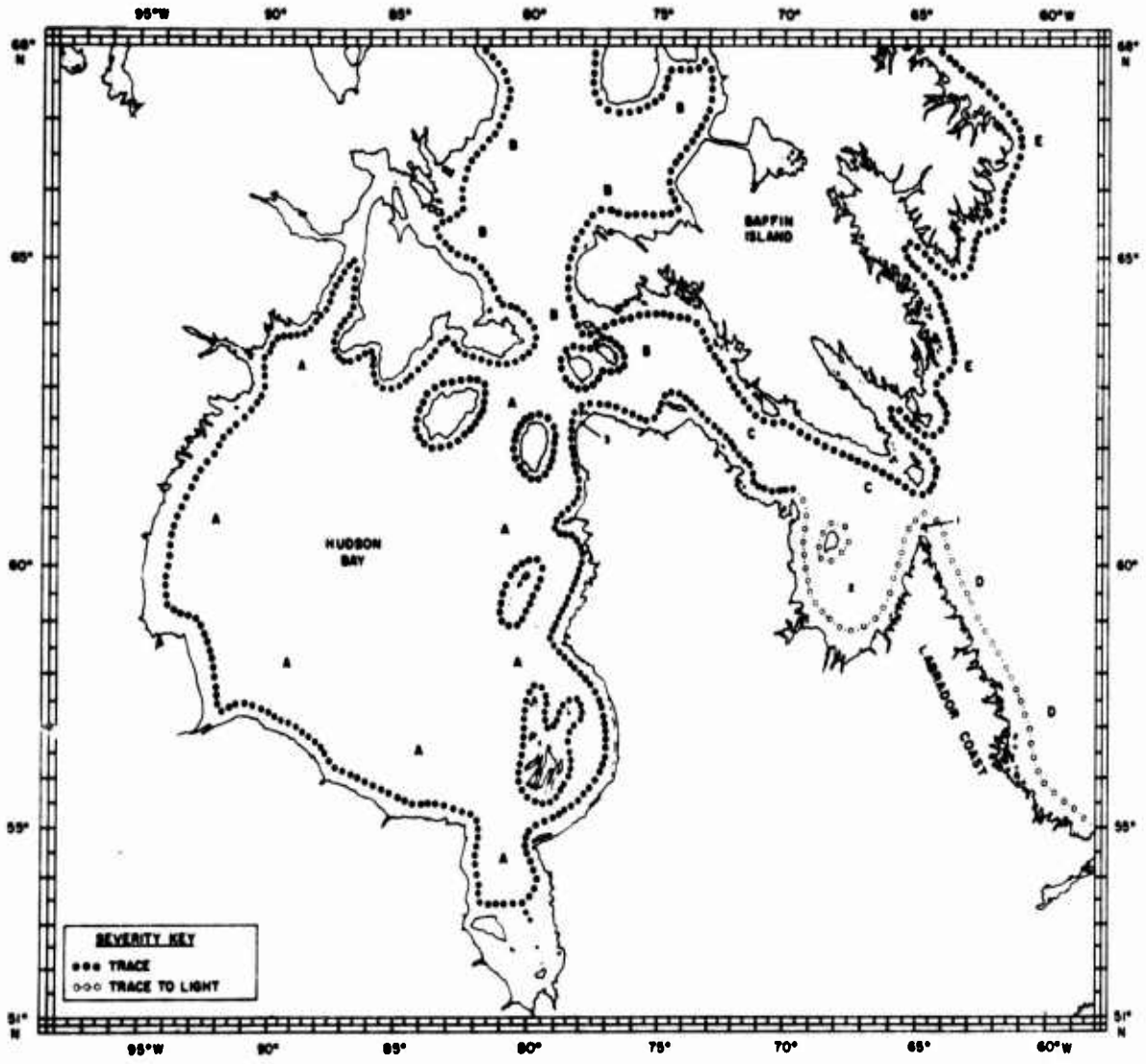

CHART 3 - HUDSON BAY

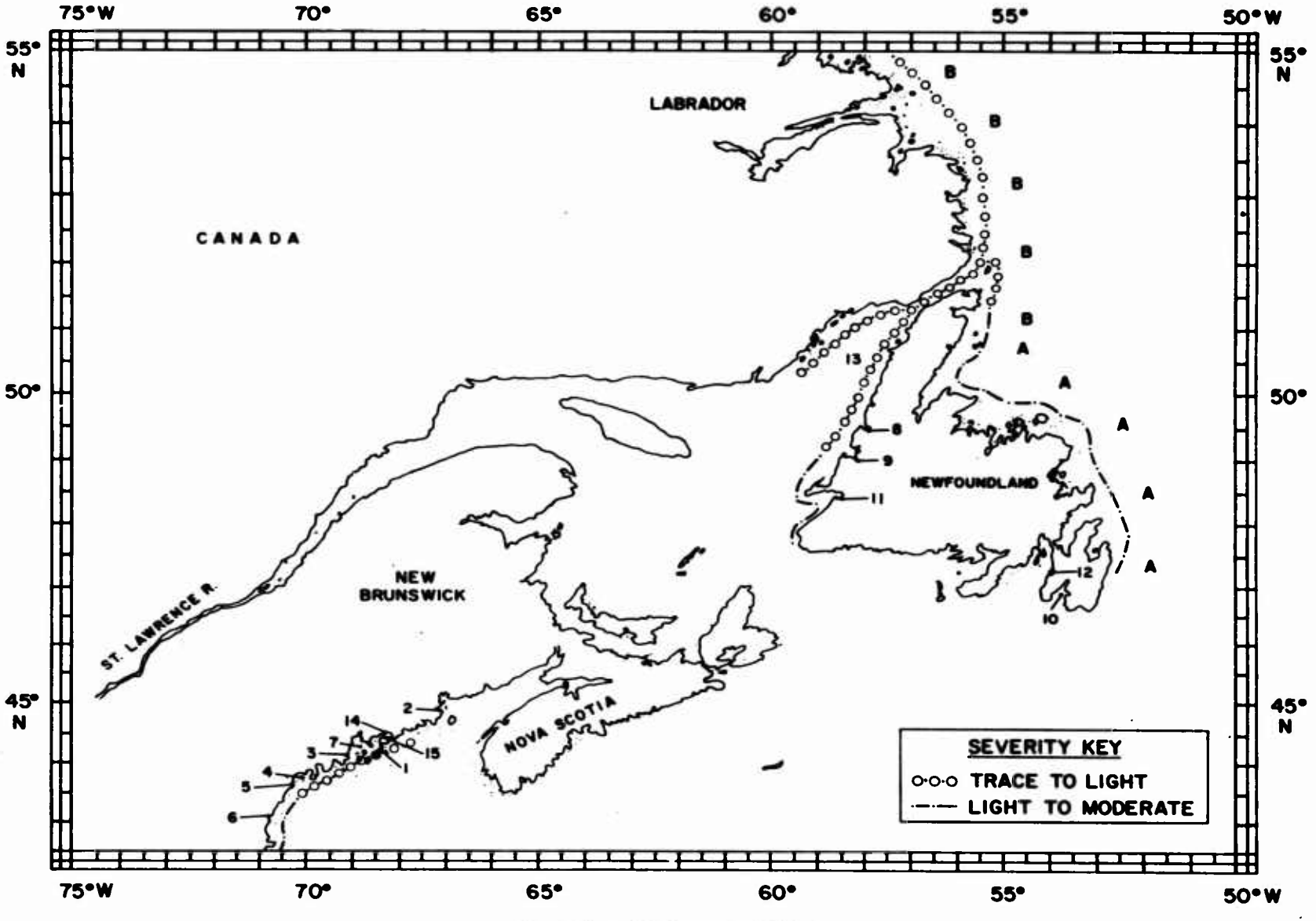

CHART 4 - ATLANTIC CANADA

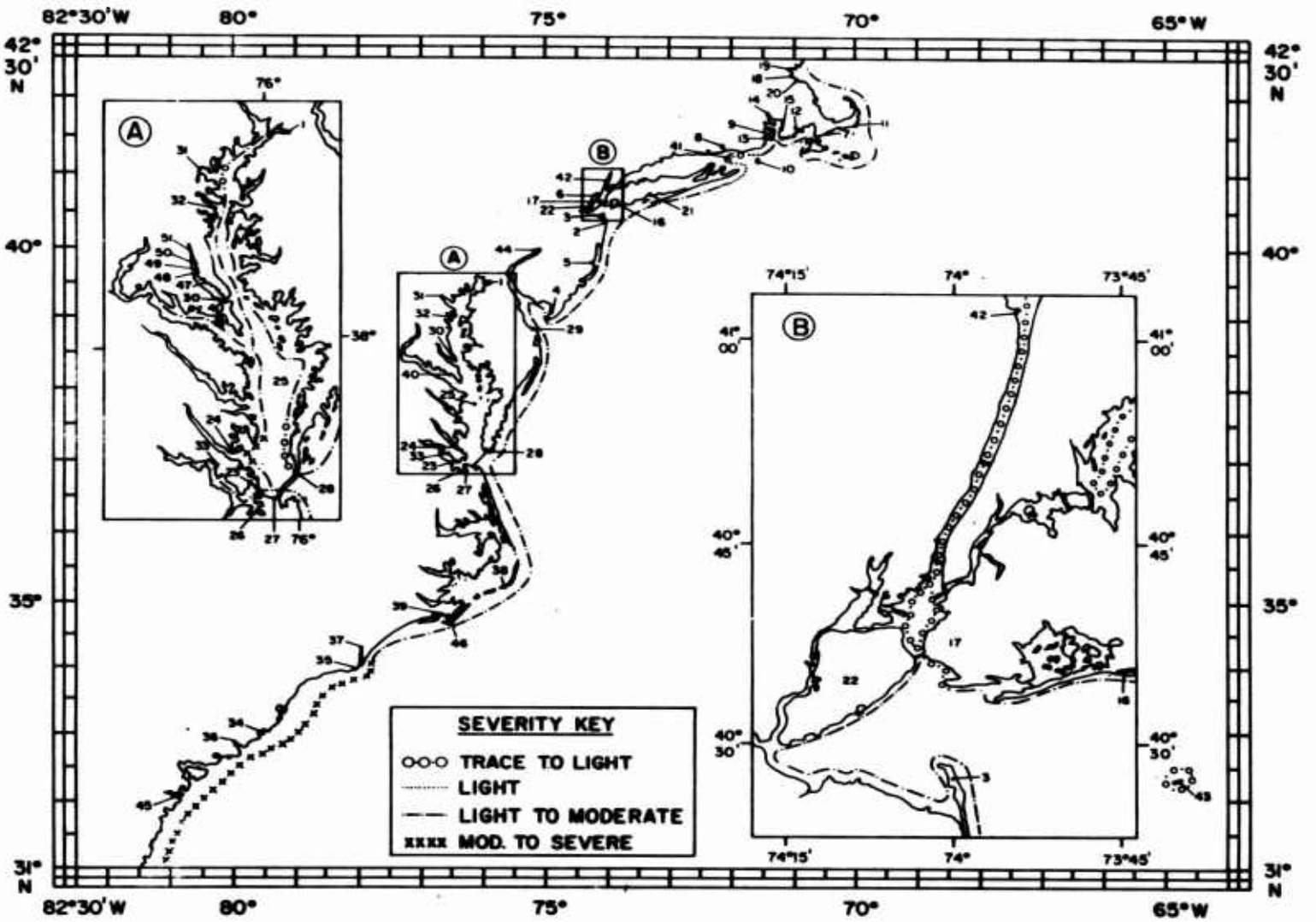

CHART 5 - ATLANTIC UNITED STATES

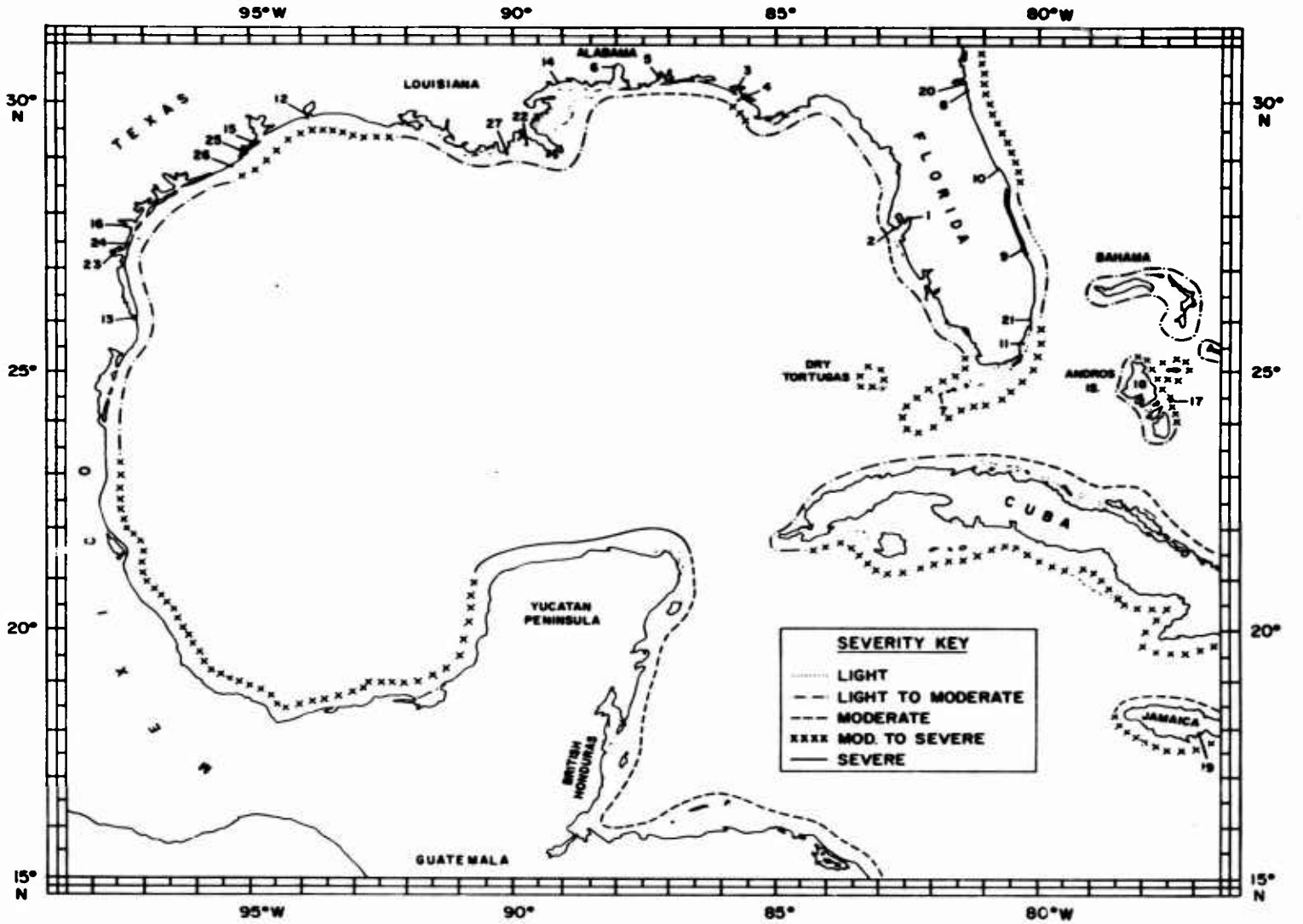

CHART 6 - GULF OF MEXICO, W. CARIBBEAN SEA

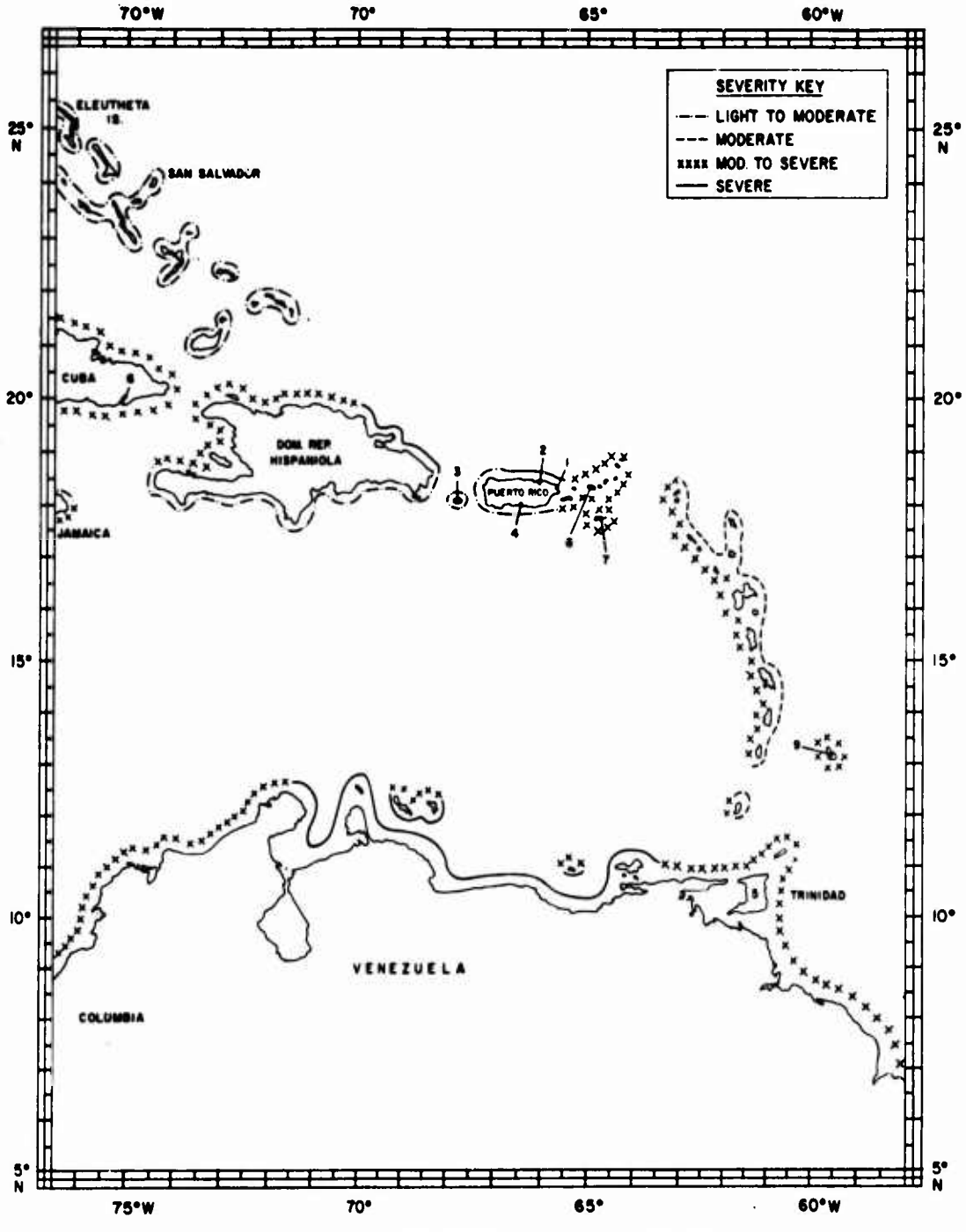

CHART 7 - E. CARIBBEAN SEA, W. INDIES

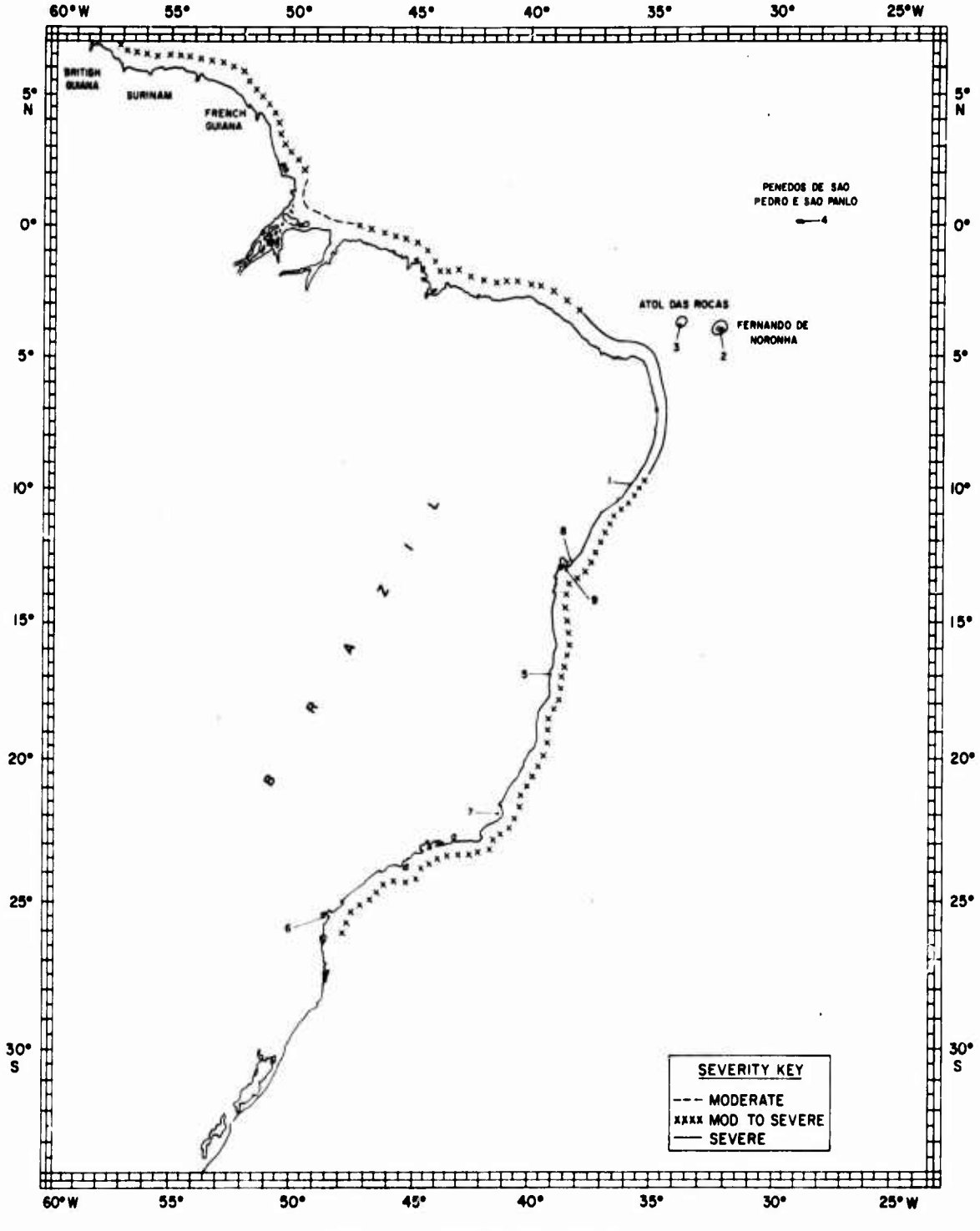

CHART 8 - BRAZILIAN COAST

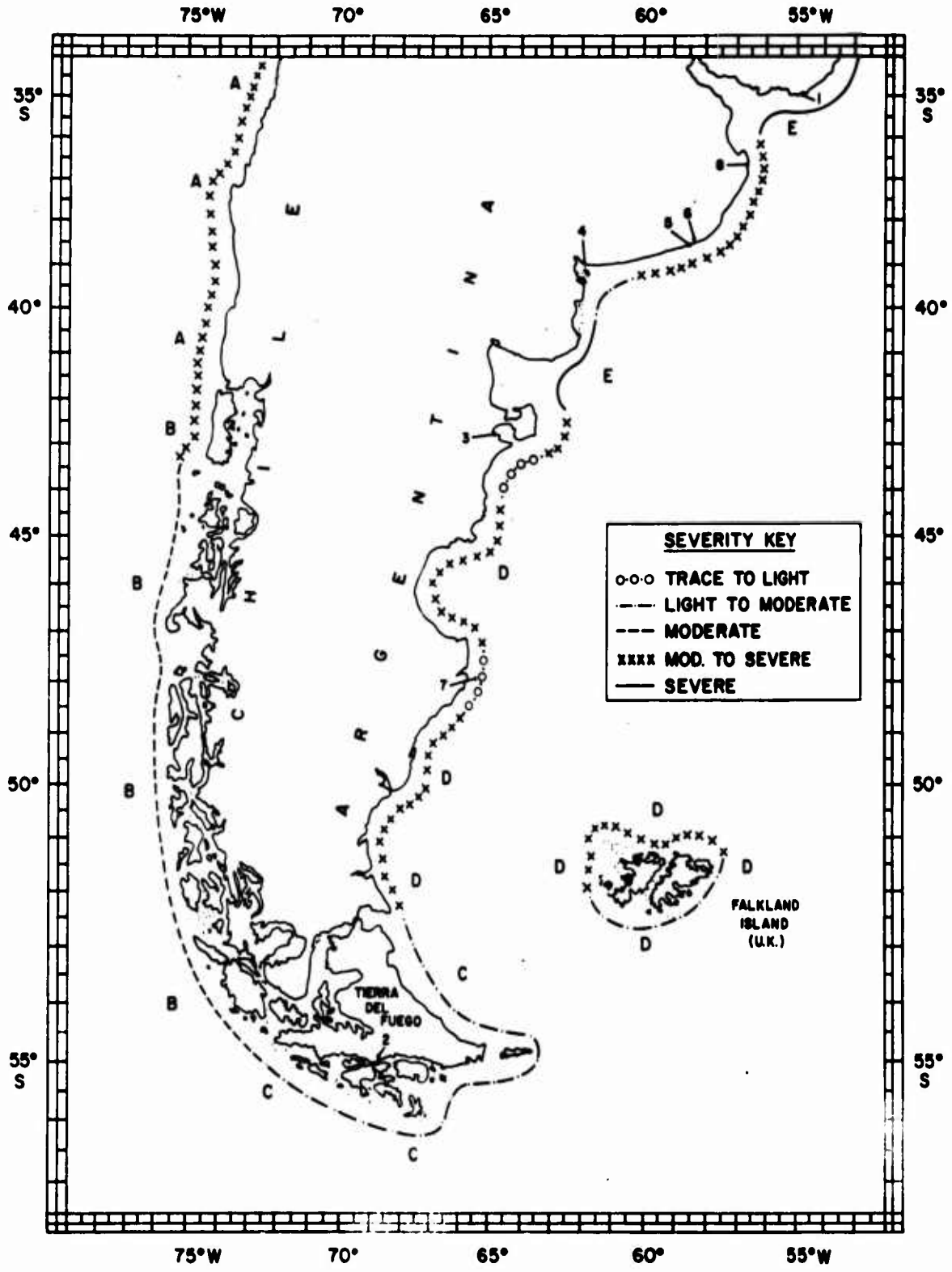

CHART 9 - CHILE, ARGENTINA

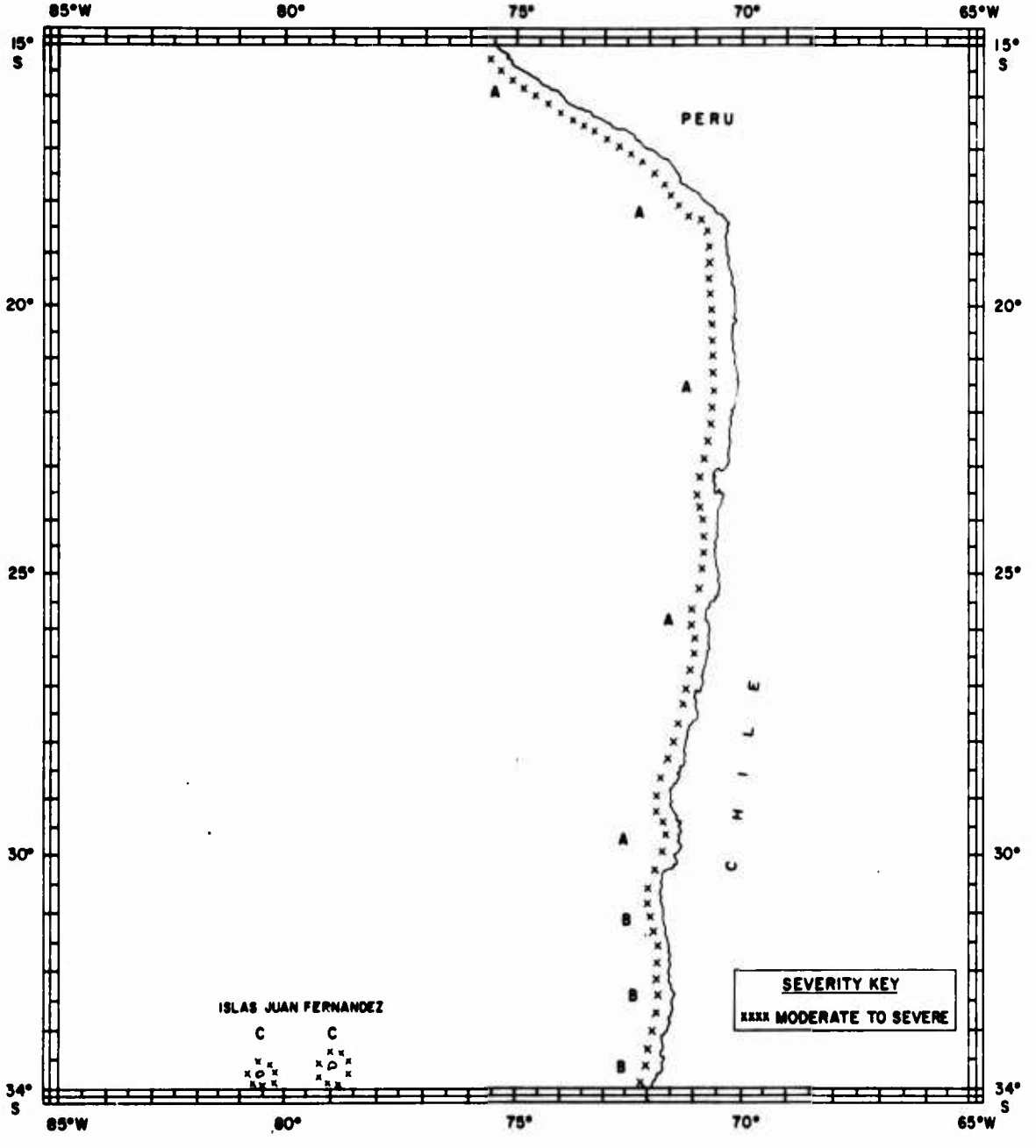

CHART 10 - CHILE, PERU

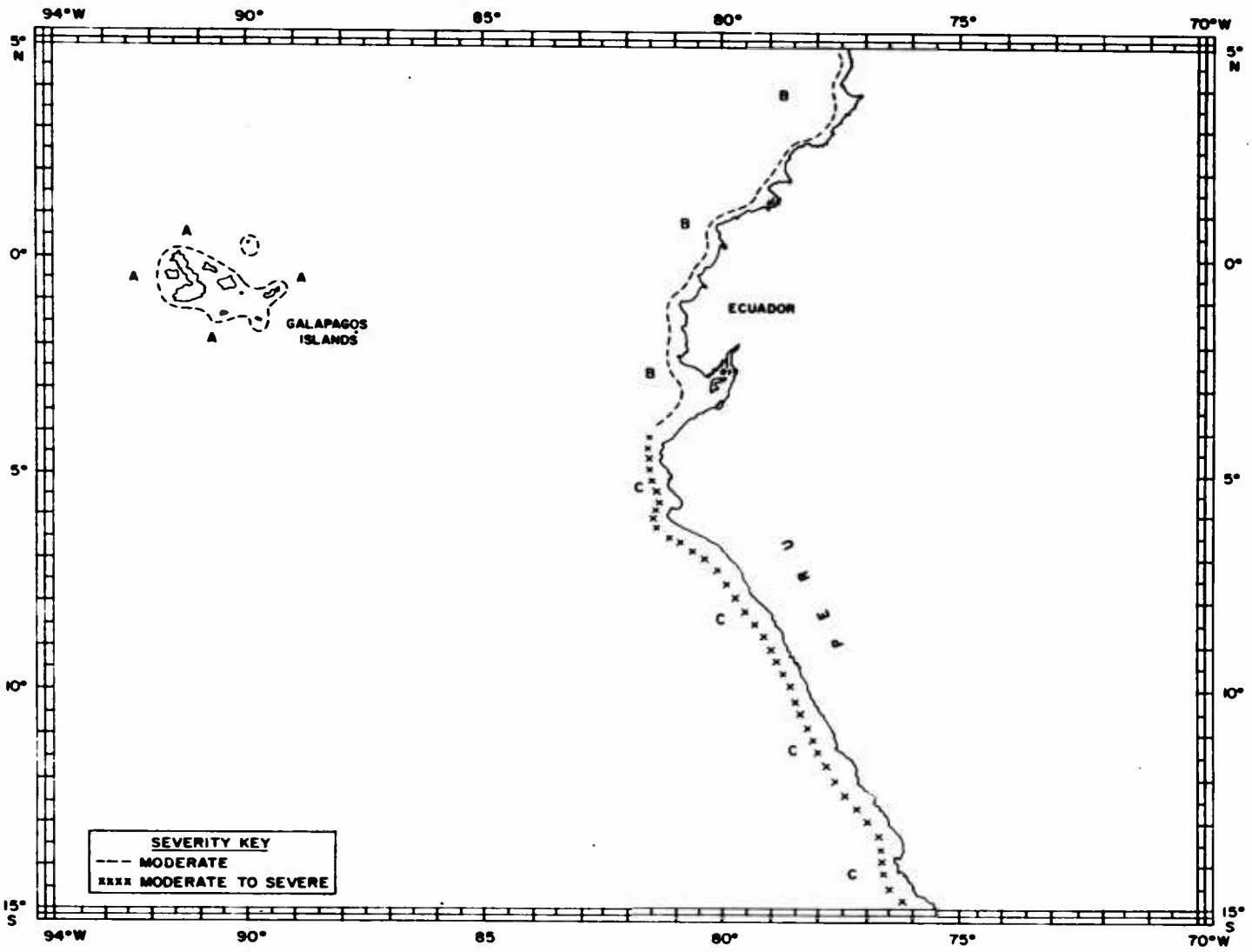

CHART 11 - COLUMBIA, EDUADOR, PERU

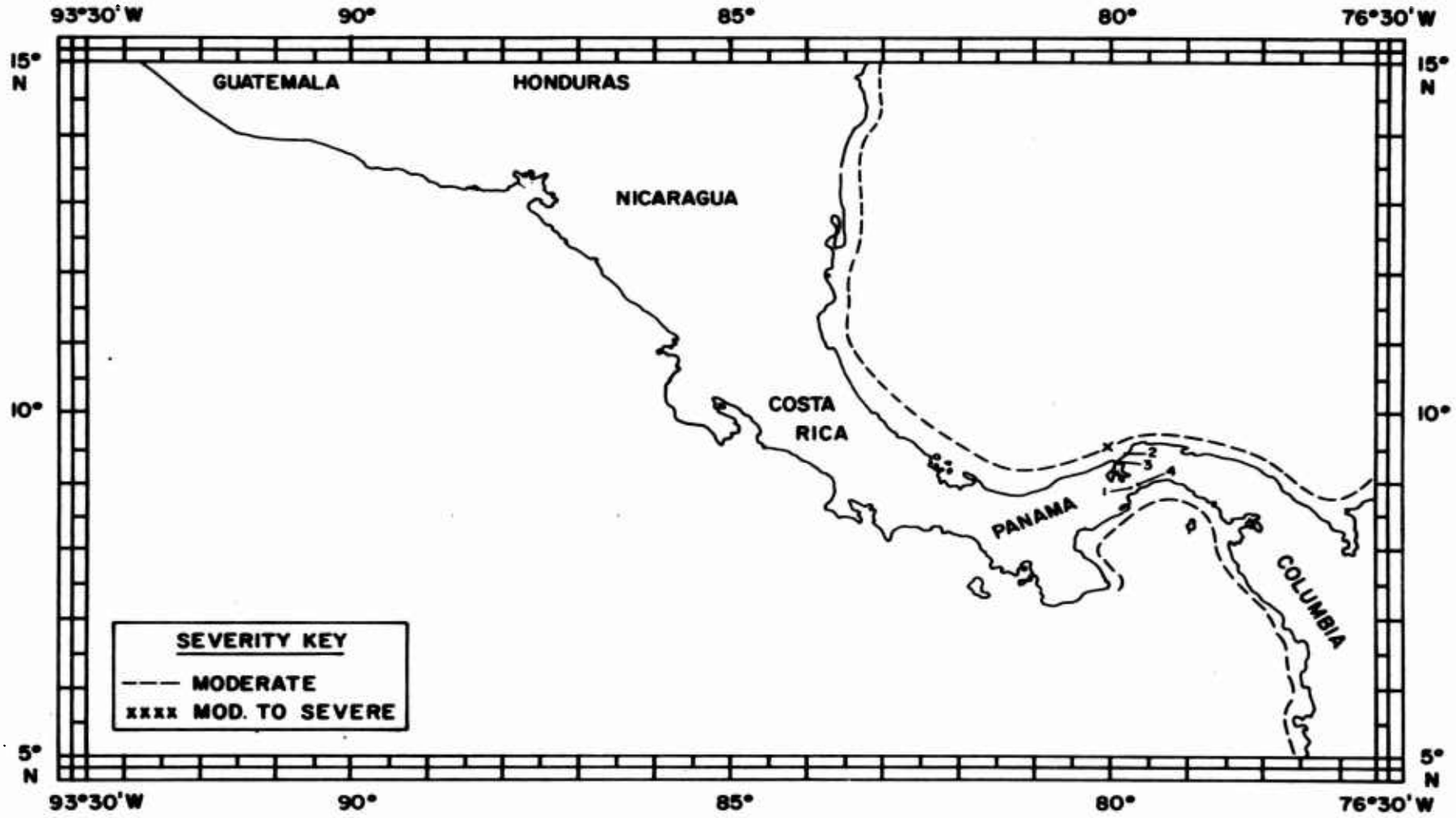

CHART 12 - CENTRAL AMERICA

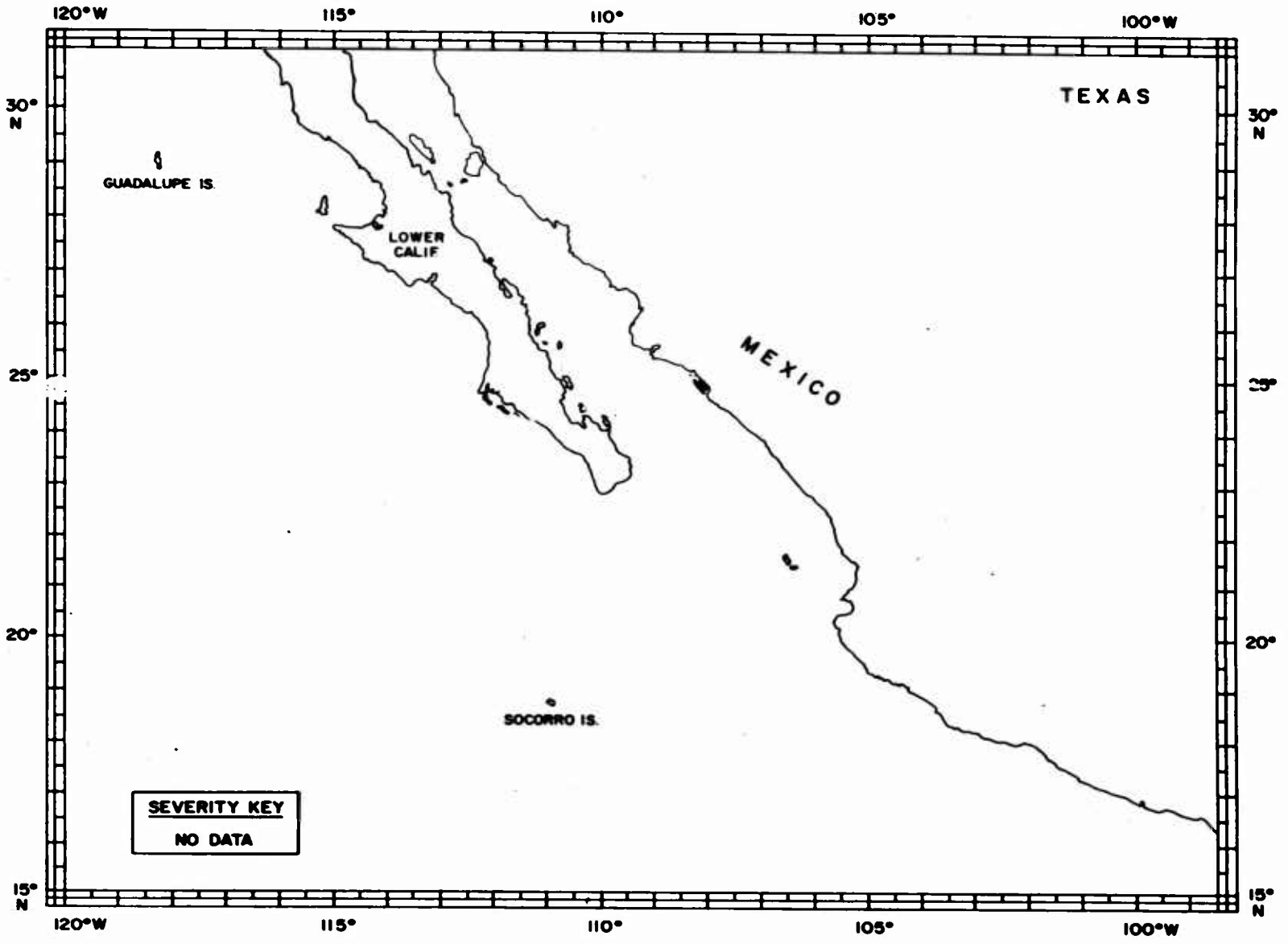

CHART 13 - PACIFIC MEXICO

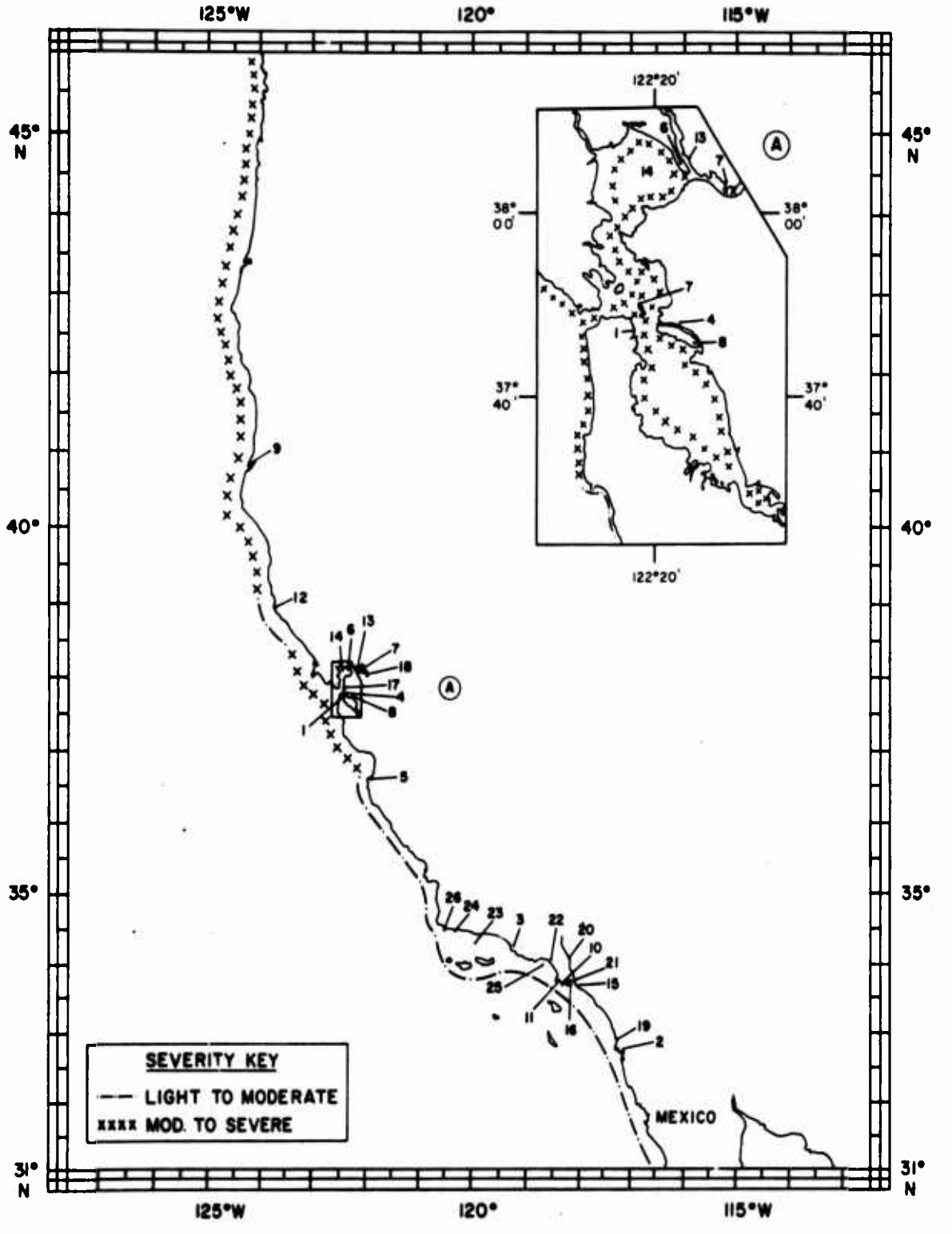

CHART 14 - PACIFIC UNITED STATES

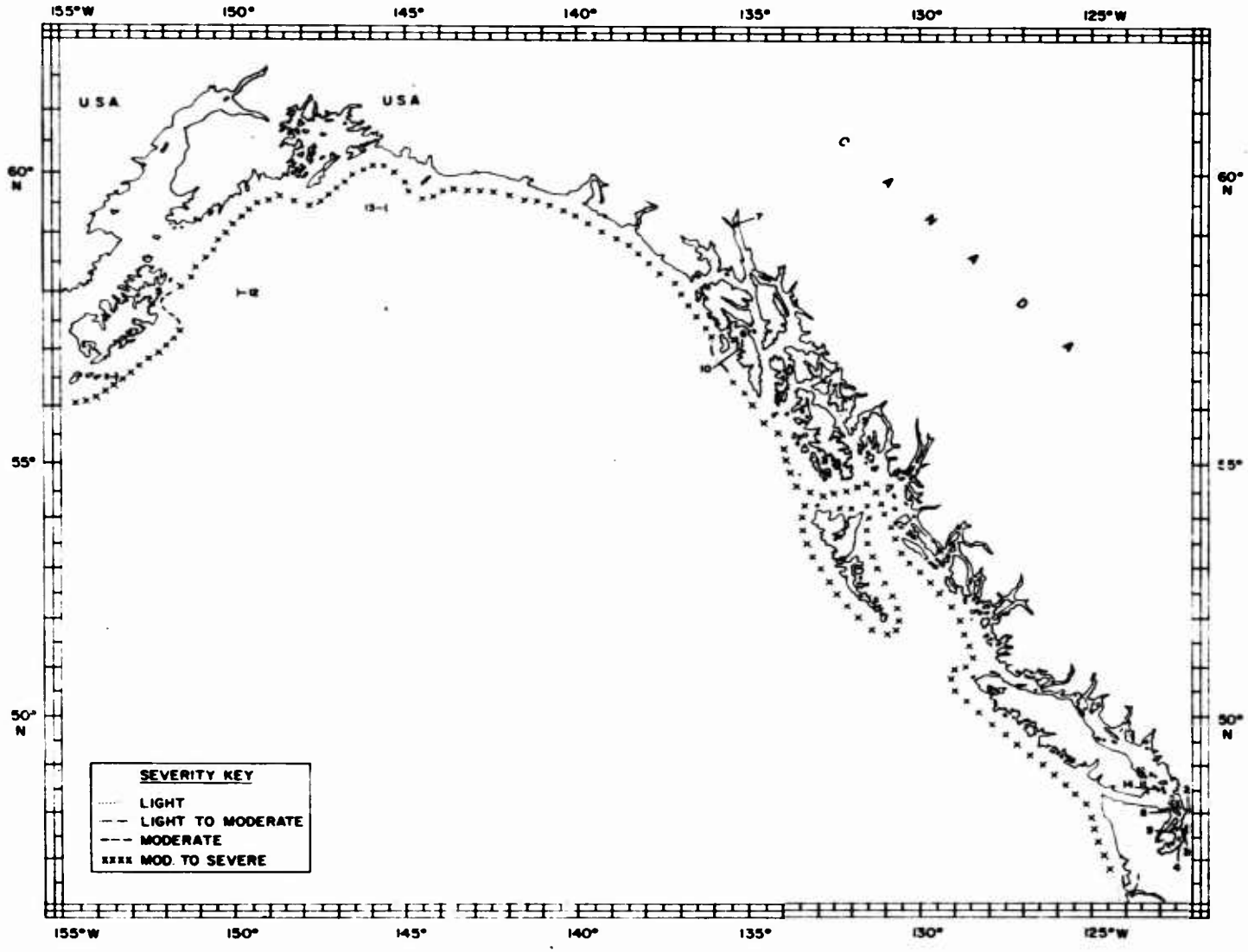

CHART 15 - GULF OF ALASKA

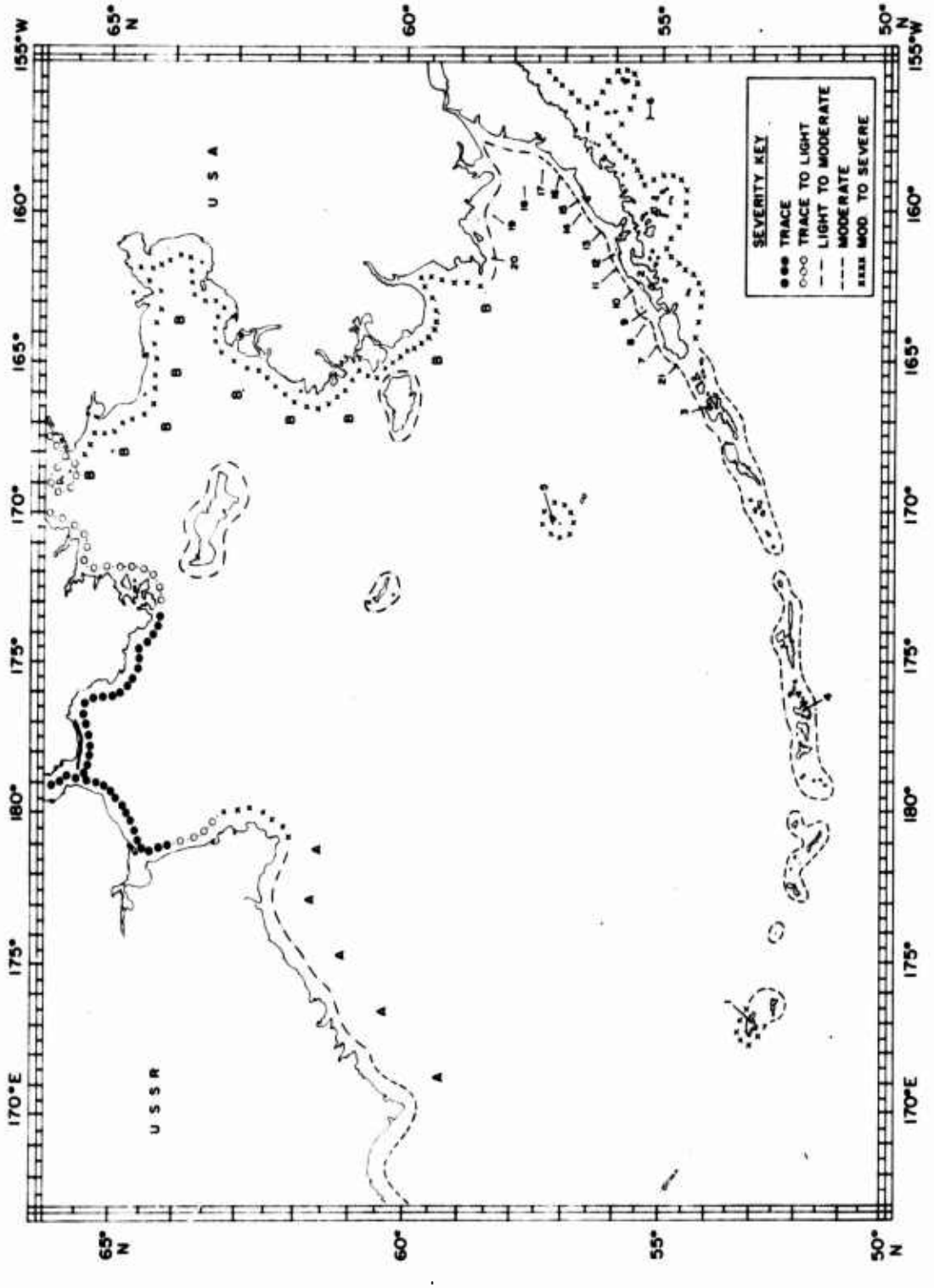

CHART 16 - BERING SEA

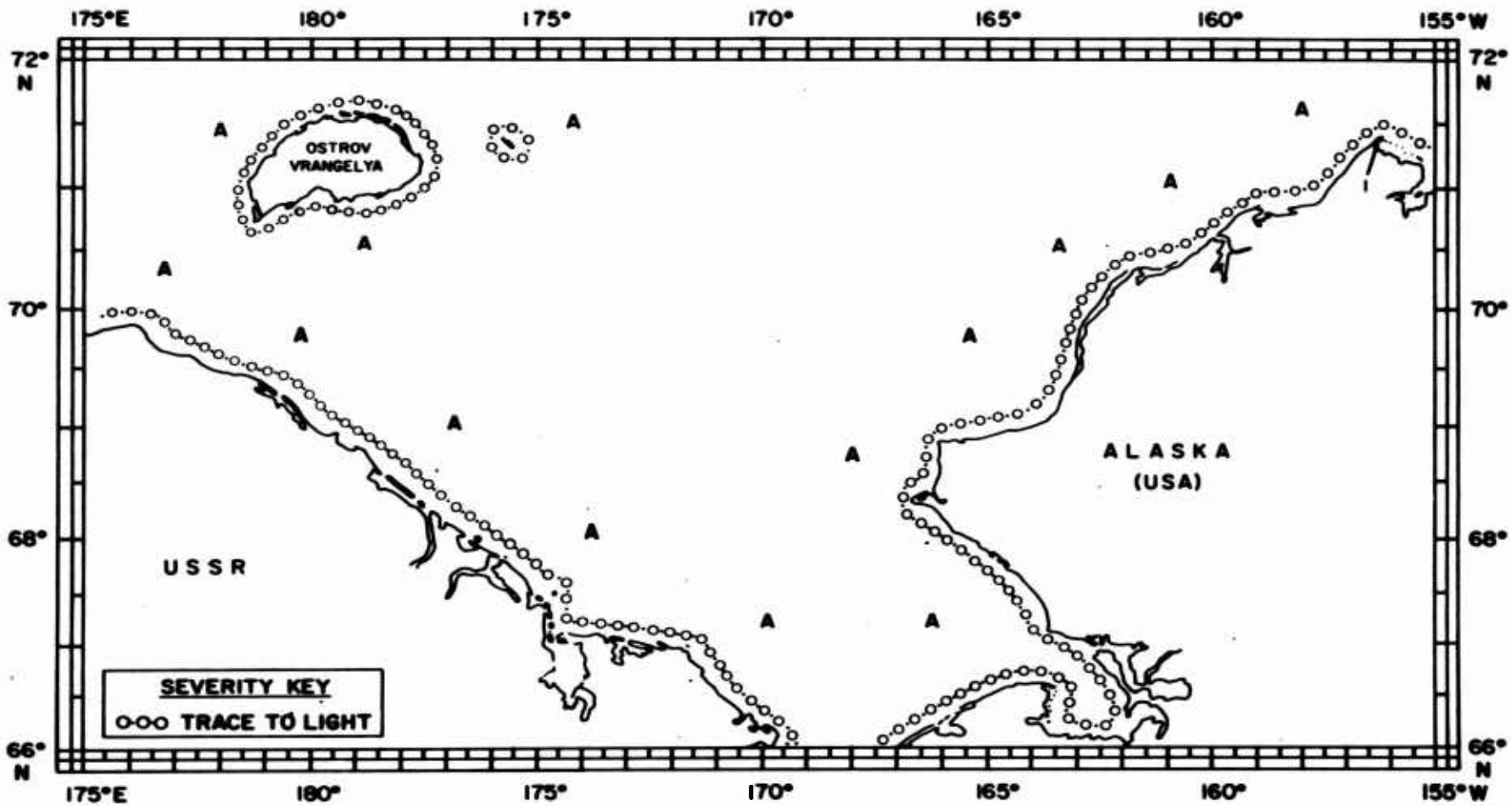

CHART 17 - CHUKCHI SEA

DATA SHEETS

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FOULING ORGANISMS – MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)

ADDITIONAL INFORMATION

1 - JAN	7 - JUL
2 - FEB	8 - AUG
3 - MAR	9 - SEP
4 - APR	10 - OCT
5 - MAY	11 - NOV
6 - JUN	12 - DEC

CHART NUMBER	LOCATION NUMBER	ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES	SILT COVER	ADDITIONAL INFORMATION
1	1	2			3	4		1					
1	A	P			P	P	P	P					PRED. ATT.
1	B	P			P	P	P	P					PRED. ATT.
2	1	1			3	4		2		5	6		MOLS. DOM. BY MUSS.
2	2	P			P	P	P	P		P	P		FOULING THRUOUT YR., BUT INSIGNIFICANT DURING COLD SEASON.
2	3	1			3	4		2		5	6		MOLS. DOM. BY MUSS.
2	4	P			P		P	P		P			STICK AREA NEAR LAT. 67°N., JUST SO. OF HOLSTEINBORG. COLLECTION DURING JULY. MOLS. INCL. MUSS. MYTILUS & MUDIS.
2	A	4			6	2	1	3		5	7		FOULING INTENSITY PRED.
2	B	4			6	2	1	3		5	7		FOULING INTENSITY PRED.
2	C	3			5	2	1	6		4	P		FOULING INTENSITY PRED.

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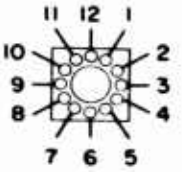
CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		1 - JAN, 2 - FEB, 3 - MAR, 4 - APR, 5 - MAY, 6 - JUN, 7 - JUL, 8 - AUG, 9 - SEP, 10 - OCT, 11 - NOV, 12 - DEC 
3	1							P					MOLS. INCL. MUSS.
3	2							P					MOLS. INCL. MUSS.
3	3	P			P		P	P					MOLS. DOM. BY MUSS.
3	A	3				2	1	5		4	6		FOULING INTENSITY PRED.
3	B					2	1			3	4		FOULING INTENSITY PRED., LOC: N. HUDSON STRAIT.
3	C	3			6	2	1	5		4	7		
3	D	3			6	2	1	5		4	7		
3	E	4			6	2	1	3		5	7		
4	1	2			1	4	3	P				L	ACORN BARNS., GREEN ALG., MOLS. DOM. BY MUSS., E-BRYS.
4	2	2			1		3						ACORN BARNS., GREEN ALG.
4	3				2	3	1					M	ACORN BARNS., E-BRYS.

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
4	4				2	3	1				4		ACORN BARNS., E-BRYS.
4	5		P		3	5	1	4		P	2	LM	MOLS. DOM. BY MUSS.: MYTILUS, ACORN BARNS., E-BRYS.
4	6	P			1	3	2	4		P	5	LM	ACORN BARNS., E & F-BRYS., GREEN ALG., MOLS. DOM. BY MUSS.: MYTILUS, SITE: PORTSMOUTH NAVAL SHIPYARD.
4	7	P	P	P	P	P	P	P	P	P			MOLS. INCL. MUSS.: MYTILUS & MODIOLUS, SNAILS, JINGLE-SHELLS: ANOMIA, CLAMS & LIMPETS. RED & GREEN ALG., E-BRYS.
4	8	4			5	2	1	3					
4	9	3	4		5	6	1	2		7			
4	10	2			3	6	4	1		5			KELP(P), MOLS. DOM. BY MUSS.: MYTILUS. CALC. TUBES.
4	11	2			4	6	3	1		5			
4	12	4			7	2	1	5		3	6	TL	GREEN ALG. E & F-BRYS., MOLS. DOM. BY MUSS.: MYTILUS & JINGLE-SHELLS: ANOMIA. PANEL DATA. SITE: USN OPERATING BASE.
4	13	P											
4	14	2			4	6	3	1		5		MS	ASBESTOS PANEL DATA: 1943 TO 1944. TUBES. INCL. POLYDORA & LEPIDONOTUS. MOLS. INCL. MYTILUS, ANOMIA & MYA., GREEN & BROWN ALG., ECHINUS (P), 5 SP. BRYS., BARNS INCL. BALANUS. SITE: N. SHORE OF EASTERN BAY.
4	15				P	P	1	P		P	P	TL	MOLS. DOM. BY MUSS.: MYTILUS., PANEL DATES: 6.12.44 TO 9.12.45., E-BRYS. SITE: USN SECTION BASE, MT. DESERT IS.

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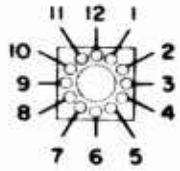


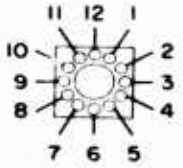
CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		1 - JAN 7 - JUL 2 - FEB 8 - AUG 3 - MAR 9 - SEP 4 - APR 10 - OCT 5 - MAY 11 - NOV 6 - JUN 12 - DEC 
4	A	4			6	2	1	3		5	7		PRED. M.A.
4	B	3			6	2	1	5		4	7		PRED. M.A.
5	1				1		2					LM	ACORN BARNS.
5	2				1		2	3			4	MS	ACORN BARNS., MOLS. INCL. MUSS.: MYTILUS & SLIPPER-SHELLS: CREPIDULA.
5	3				1	4	3	5			2	LM	E-BRYS., ACORN BARNS., MOLS. INCL. CREPIDULA.
5	4	P	P		2	3	1	P		4		LM	ACORN BARNS. E(M.A. 6-11) & F(M.A. 6-8) BRYS., GREEN ALG., MOLS. INCL. MUSS.: MYTILUS. WOOD PANEL DATES: 8.4.44 TO 5.8.46. SITE: USN AIR STATION. SERPULID TUBES.
5	5	5			1	4	3	2			6	M	ACORN BARNS., MOLS. INCL. MUSS.: MYTILUS, E&F-BRYS., GREEN ALG., PANEL DATA.
5	6		P		2	P	1				3	LM	E-BRYS., ACORN BARNS., WOOD PANEL DATES: 20.7.44 TO ?.12.47. SITE: BAYONNE ANNEX, N.Y. NAVAL SHIPYARD.
5	7				P	P	P	P		P	P		
5	8	P	P		1	3	2	P			4	M	ACORN BARNS. E(N.A. 6-11) & F(M.A. 6-8) BRYS., GREEN ALG., MOLS. INCL. MUSS.: MYTILUS & JINGLE-SHELLS: ANOMIA.
5	9	5			2	4	1	3				MS	ACORN BARNS., E&F-BRYS., GREEN ALG., MOLS. INCL. MUSS.: MYTILUS.

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
5	10	4			3	2	1					M	E & F-BRYS., RED (M.A. 6-8) & GREEN (M.A. 3-5) ALG., ACORN BARNS.
5	11	3			2	1	4	5				M	RED (M.A. 6-8) & GREEN (M.A. 1-2) ALG., MOLS. INCL. MUSS.: MYTILUS., E (M.A. 6-11) & F (M.A. 6-11) BRYS.
5	12				1	5	3			4	P	M	ACORN BARNS., E (M.A. 3-5) & F (M.A. 9-11) BRYS., SERPULID TUBES.
5	13				1	3	2	5		P	4	M	MOLS. INCL. MUSS.: MYTILUS (M.A. 3-8) & SLIPPER-SHELLS: CREPIDULA (M.A. 6-11), ACORN BARNS., E (M.A. 6-8) & F (M.A. 6-11) BRYS., SERPULID TUBES.
5	14				1		2					M	
5	15				3	2	1					M	E-BRYS., ACORN BARNS.
5	16	3			4		2	1				S	ACORN BARNS., MOLS. INCL. MUSS., GREEN ALG., PANEL DATA FROM COAST GUARD STATION.
5	17		P		1	P	2	P			3	S	E-BRYS., MOLS. INCL. MUSS.: MYTILUS, ACORN BARNS., WOOD PANEL DATES: 31.5.44 TO 2.10.46. SITE AT FT. LAFAYETTE.
5	18	P	P		2	P	1	3	P		4	TL	MOLS. INCL. MUSS.: MYTILUS, ACORN BARNS., E & F-BRYS., GREEN ALG.
5	19				1		2	3			4	MS	MOLS. INCL. MUSS.: MYTILUS., ACORN BARNS.
5	20				1		2				3	M	ACORN BARNS.
5	21				3	4	2	1		5	6	S	E & F-BRYS., ACORN BARNS., MOLS. INCL. MYTILUS, SERPULID TUBES.

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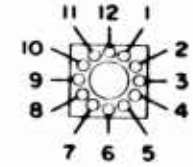

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		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
5	22				1		2					M	ACORN BARNS.
5	23				2			1					MOLS. INCL. MUSS.
5	24				1	3	2			4	5	MS	ACORN BARNS., E-BRYS., SERPULID TUBES.
5	25	P	P	P	P	P	P	P	P	P	P		MOLS. INCL. OYSTERS, MUSS., JINGLE-SHELLS, CLAMS. SOL. & COL. TUNS., E & F-BRYS. AMPHIPOD IS CAPRELLA. 7 SP. SPONGES, 4 SP. BRYS., 3 SP. ALG., 3 SP. ANEMONES. 4 SP. ANNELIDS.
5	26		P		1	4	2	P		5	3	MS	ACORN BARNS., E-BRYS., MOLS. INCL. MUSS.: MYTILUS, OYSTERS: OSTREA, ALSO ANOMIA. WOOD PANEL DATES: 6.7.44 TO 16.12.44. SITE: USN SHIPYARD.
5	27	P			1	3	2	P		5	4	MS	E-BRYS., ACORN BARNS., MOLS INCL. MUSS.: MYTILUS, OYSTERS: OSTREA. WOOD PANEL DATES: 16.6.44 TO 16.12.44. SERPULID TUBES. SITE: USN OPERATING BASE.
5	28	4			3	2	1	5				MS	E-BRYS., GREEN ALG., ACORN BARNS., MOLS. INCL. OYSTERS.
5	29				1	3	2	5		4		MS	ACORN BARNS., E-BRYS., MOLS. INCL. SLIPPER-SHELL: CREPIDULA. SERPULID TUBES.
5	30	4	P	P	1	2	3	P	P	P	5	MS	E-BRYS., ACORN BARNS., GREEN ALG., ISOPODS (P), TUNS. ARE MOLGULA. 3 SP TUBES INCL. POLYDORA. 5 SP. BRYS., 5 SP. MOLS., STUDY DATES: 4 TO 12.63 & 4 TO 12.64. 2-5 M DEPTH.
5	31				2		1					M	ACORN BARNS.
5	32				1	2	3					MS	E-BRYS., ACORN BARNS.
5	33				1	3	2	4				S	F-BRYS., MOLS. INCL. MUSS.: MYTILUS, ACORN BARNS. DATA FROM 3 SITES ON JAMES RIVER.

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CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
5	34	P			P		P	P					
5	35				1		2	3		4		LM	MOLS. INCL. MUSS.: MYTILUS, ACORN BARNS., SERPULID TUBES.
5	36				1	3	2	4		6	5	M	MOLS. INCL. MUSS.: MYTILUS., JINGLE-SHELLS: ANOMIA, OYSTERS: OSTREA, E&F-BRYS., SERPULID TUBES., WOOD PANEL DATA: 1.7.44 TO ?.12.47. DATA FROM 5 SITES.
5	37				1		2	3				MS	MOLS. INCL. MUSS.: MYTILUS ACORN BARNS. DATA FROM 2 SITES.
5	38				1	3	2	5		4		M	ACORN BARNS., F-BRYS., MOLS. INCL. OYSTERS., SERPULID TUBES.
5	39				1	2				3		LM	E(M.A.6-8) & F(M.A.3-5) BRYS., ACORN BARNS., SERPULID TUBES.
5	40				1	3	2					M	E-BRYS., ACORN BARNS.
5	41	3			2	4	1				5	M	ACORN BARNS., GREEN ALG., E & F-BRYS.
5	42				1		2					M	SITE ON HUDSON RIVER.
5	43	1			5	3	4	P		2		M	GREEN, RED & BROWN ALG., E(M.A.9-11) & F(M.A.3-5)-BRYS., MOLS. INCL. ANOMIA & OSTREA, ACORN BARNS., SERPULID TUBES. WOOD PANEL DATA: ?.12.47 FROM 19.2.46. SITE: SMALL DRY DOCK OF HAMILTON.
5	44	P					P					M	OLD SILT. HIGH POLLUTION FACTOR, GREEN & BROWN ALG., LOW SALINITY. WOOD PANEL DATA: 17.7.44 TO 17.3.47. SITE: PHILADELPHIA NAVAL SHIPYARD AT DELAWARE & SCHUYLKILL RIVERS.
5	45		P		1	P	2	P			P	LM	MOLS. INCL. MUSS.: MYTILUS., E-BRYS., WOOD PANEL DATA: 31.8.44 TO 1.6.46. SITE: USN STATION — 14 M; SO. OF SAVANNAH, GA. SAVAN RIVER MOUTH.

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CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
5	46		P		P	P	P	P	P	P	P		MOLS. INCL. OSTREA, MODIOLUS, MYTILUS, ANOMIA. ISOPODS (P), EBNIDS. (P), E&F-BRYS., TUNS. ARE STYELA., 51 SP. HYDROIDS, 6 SP. SPONGES, 6 SP. BARNS., GLASS, WOOD, TILE PANEL DATED: ?.3.41 TO ?.2.42.
5	47	3	3	2	1	1	2	2	2	1	1	MS	ISOPODS (REL. AB. 3), E-BRYS. GREEN ALG., MODIOLUS BARBS., OYSTERS INCL. CRASSOSTREA, TUBES. INCL. POLYDORA, 4 SP. BRYS., 2 SP. TUBES., LM FOULING., 8 M. DEPTH. STUDY DATES: 12 TO 4.63 & 12 TO 4.64
5	48	3	1	1	1	1	1	2	3	2	1		ISOPODS (P), MOLS. MUSS. & OYSTERS: OSTREA & CRASSOSTREA, TUNS. MOLGULA 1 SP. SPONGE. STUDY DATES: 12 TO 4.63 & 12 TO 4.64. DEPTH: 7M.
5	49	3	1	1	1	1	1	2		2	1		MOLS. INCL. MUSS., 4 SP. BRYS., TUNS. ARE MOLGULA, 8M. DEPTH. STUDY DATES: 12 TO 4.63 & 12 TO 4.64.
5	50	3	1	2	1	1	1	2		3	2		3 SP. E&F-BRYS., MOLS. INCL. MUSS., 5M. DEPTH., STUDY DATES: 12 TO 4.63 & 12 TO 4.64.
5	51	3	1		1	2	1	2		3			MOLS. INCL. MUSS., E&F-BRYS. (2 SP.), 5M. DEPTH., STUDY DATES: 12 TO 4.63 & 12 TO 4.64.
6	1				1	2	5	3			4		
6	2				1	3	2	4			5		MOLS. DOM. BY OYSTERS.
6	3				1	2	3	4					MOLS. DOM. BY OYSTERS.
6	4			3	1		4	2		5			MOLS. DOM. BY MUSS. & OYSTERS, FACTS. (P). PLASTIC FLOAT SYSTEM USED. SITE WAS 2 MI OFFSHORE MOUTH OF ST. ANDREWS BAY, FLA. DEPTH: 60 FT. LOC. LAT. 85° 46' 36" N, LONG. 30° 07' 04" W.
6	5	P			1	3	2	5	P	4	P		MOLS. DOM. BY OYSTERS: OSTREA & MUSS.: MYTILUS, THEN JINGLE-SHELLS: ANOMIA., E&F-BRYS. WOOD PANEL DATES: 22.7.44 TO ?.12.47. SITE WAS: USAF AIR COMMAND.

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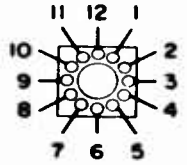

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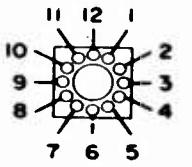
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		1 - JAN 7 - JUL 2 - FEB 8 - AUG 3 - MAR 9 - SEP 4 - APR 10 - OCT 5 - MAY 11 - NOV 6 - JUN 12 - DEC 
6	6				1		2	4		3			MOLS. DOM. BY MUSS. DATA FROM 3 SITES.
6	7	R	P		P	3	1	P		4	P	LM	RED & GREEN ALG., E & F-BRYS. MOLS. INCL. JINGLE-SHELLS: ANOMIA. DATA FROM 2 STATIONS. SITE: USN STATION. WOOD PANELS: 7.6.44 TO ?.12.47.
6	8				1	3	2	4		5			MOLS. DOM. BY MUSS.
6	9	5			1	2	3			4			GREEN ALG.
6	10	6			1	2	5	4		3	6	TL	MOLS. DOM. BY MUSS.: MYTILUS & OYSTERS: OSTREA, ANOMIA (P), E & F-BRYS. UNTREATED WOOD PANEL DATA: 1942 TO 1945. SITE: PORCE DE LEON INLET.
6	11	5			1	2	6	5		4	3		E & F-BRYS., SOL. & COL. TUNS., MOLS. INCL. JINGLE-SHELLS: ANOMIA & OYSTERS: OSTREA. RED & GREEN ALG. GLASS PANEL DATA FROM 3 SITES. 163 DAYS IMMERSION.
6	12				1	3	2						
6	13				2		1	3					MOLS. DOM. BY OYSTERS.
6	14				1	2	4			3			
6	15	P			1	2	3	P		P	P	LM	GREEN ALG., MOLS. INCL. OYSTERS: OSTREA & JINGLE-SHELLS: ANOMIA, E-BRYS. WOOD PANEL DATA FROM USN BASE: 21.7.44 TO 15.7.46.
6	16	6			1	3	2	5	T	4		LM	GREEN ALG., E & F-BRYS., MOLS. INCL. JINGLE-SHELLS: ANOMIA & MUSS.: MYTILUS, & OYSTERS: OSTREA. WOOD PANEL DATA: 10.6.44 TO ?.12.44. SITE: USN STATION.
6	17	1			3		2						

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		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
6	18				1								SITE WITHIN TIDAL ZONE.
6	19	5			1	3				4	2		M.A. PRED.
6	20				1	3	2	5		4		LM	E&F-BRYS. MOLS. INCL. MUSS.: MYTILUS, JINGLE-SHELLS: ANOMIA, OYSTERS: OSTREA. WOOD PANEL DATA: 8.6.44 TO ?.12.47. SITE: USCG TRAINING STATION ON ST. JOHN'S RIVER, 22 Mi. FROM JACKSONVILLE, FLA.
6	21	P	P		P	P	P	P	P	P	P		CORAL (P), E&F-BRYS., RED, BROWN & GREEN ALG., MOLS. INCL. MIXED PELS. & GASTS. PLATE & RUBBER STRIP PANEL DATA: ?.9.61 TO ?.9.62. PEAK FOULING AT 2.7 M. SITE: 2 Mi. EA. OF FT. LAUDERDALE, FLA.
6	22	P	1	P	1	P	1	P		P			GREEN ALG., E-BRYS., MOLS. INCL. OSTREA, CRASSOSTREA & ARCA, CORAL (P) & IS ACTINARIA. STUDY DATES: 5.4.46 TO 12.2.50. SITE: LOUISIANA TOWER. DEPTH: 50 FT LOC. 16 Mi. SE OF BARATARIA PASS.
6	23	P	P		P			P					ECOLOGICAL STUDY, ORGANISMS ONLY NOTED. STUDY DATES: 1950 TO 1953. INCL. ALAZAN BAY, TEXAS.
6	24	P	P		P			P		P			GREEN ALG., HYDROZOANS (P), ISOPODS (P), MOLS. INCL. PELS. & GASTS. SITE: JUST N. OF BAFFIN BAY, TEXAS.
6	25	P	P	P	P	P	P	P		P			MUD BOTTOM. E-BRYS., MOLS. INCL. OSTREA, CRASSOSTREA & ARCA. TEXAS TOWER SITE 10.6 Mi ENE OF FREEPORT, TEXAS & 4 Mi SO. OF OYSTER BAY. STUDY DATES: 1.7.48 TO 5.7.49.
6	26	P	P	P	P	P	P	P		P			GREEN ALG., CORAL: ACTINARIA (P), E-BRYS., MOLS. INCL. OSTREA & CRASSOSTREA. 60 FT. DEPTH. STUDY DATES: 20.7.48 TO 17.7.49. SITE: TEXAS TOWER, 6 Mi. FROM FREEPORT.
6	27	P			P	P		P					E-BRYS., MOLS. INCL. PELS., BUT NO OYSTERS. 30 FT. DEPTH. LOUISIANA TOWER SITE, 7 Mi. SE OF SOUTHWEST PASS.
7	1	1			2		3						

ADDITIONAL INFORMATION

1 - JAN	7 - JUL
2 - FEB	8 - AUG
3 - MAR	9 - SEP
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6 - JUN	12 - DEC

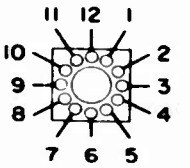

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		1 - JAN, 2 - FEB, 3 - MAR, 4 - APR, 5 - MAY, 6 - JUN, 7 - JUL, 8 - AUG, 9 - SEP, 10 - OCT, 11 - NOV, 12 - DEC 
7	2	6			1	4	3	7	8	2	5	M	GREEN ALG., E&F-BRYS., MOLS. INCL. JINGLE-SHELLS: ANOMIA, MUSS.: MYTILUS & OYSTERS: OSTREA. WOOD PANEL DATA: 21.9.44 TO ? 12.47. SITE: USN AIR STATION.
7	3	1					2						
7	4	2			4	1	3			5			
7	5	7			2	3	1	5	8	4	6	LM	MOLS. DOM. BY OYSTERS: OSTREA & INCL. JINGLE-SHELLS: ANOMIA, RED ALG., E&F-BRYS., WOOD PANEL DATA: 20.6.44 TO ? 12.47. SITE: USN BASE.
7	6	P			1	3	2	4	P	5	P	MS	GREEN ALG., E&F-BRYS., MOLS. INCL. OYSTERS: OSTREA, MUSS.: MYTILUS & JINGLE-SHELLS ANOMIA, ALSO SCALLOPS: PECTIN(P). WOOD PANEL DATES: 16.8.44 TO ? 12.47. SITE: USN BASE.
7	7	P			P	P	P		P	P			
7	8	5			3	2	1	4	8	6	7	LM	E&F-BRYS., MOLS. INCL. OYSTERS: OSTREA & JINGLE-SHELLS: ANOMIA, GREEN & RED ALG. WOOD PANEL DATA: 1.7.44 TO 7.4.47. SITE: USN BASE.
7	9	2			7	4	5	6	3	1			MOLS. DOM. BY OYSTERS: CRASSOSTREA, E&F-BRYS., STUDY DATES: 14.1.64 TO 14.1.65.
8	1	6			1	5		2		4	3		MOLS. DOM. BY MUSS., UNIFORM GROWTH THRUOUT YR.
8	2	P			P	P	P	P	P	P	P		
8	3	P			P	P	P	P	P	P	P		

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
8	4	P			P	P	P	P	P	P			
8	5				2	3	1	5		4	6		MOLS. DOM. BY MUSS., E & F-BRYS.
8	6	6			1	2	4	7		5	3		
8	7	6			1	2	4	7		5	3		
8	8				2	3	1	5	7	4	6	LM	E & F-BRYS., MOLS DOM. BY MUSS. & INCL. JINGLE-SHELLS: ANOMIA, OYSTERS: OSTREA, SCALLOPS: PECTEN, E-SPONGES, GREEN & RED ALG. WOOD PANEL DATA: ? 6.44 TO ? 6.45. SITE: USN FACILITY.
8	9	6			1	5		2		4	3		UNIFORM GROWTH THRUOUT YR.
9	1	P			P	P	P	P		P			
9	2	2			3	2	2	4		1			MOLS. DOM. BY SLIPPER-SHELLS: CREPIDULA, LM FOULING, E & F-BRYS. WOOD PANEL DATA: 25.2.64 TO ? LOC.: LAT. 54°49'S, LONG. 68°18'W.
9	3	4				3	2	6	6	5	1		MOLS. DOM. BY MUSS.: MYTILUS, E & F-BRYS., WOOD PANEL DATA: 18.11.63 TO ? LOC.: LAT. 42°46'S, LONG. 65°01'W.
9	4				2	1	3			2	2		E & F-BRYS., WOOD PANEL DATA: 27.11.63 TO ? LOC.: LAT. 38°58'S, LONG. 62°05'W.
9	5	4			4	1	3			2			MOLS. DOM. BY MUSS., THEN CHITONS, E-BRYS., SERIES OF WOOD PANELS. STUDY DATES: 12.12.63 TO 30.12.64. LOC.: LAT. 38°35'05"S, LONG. 58°40'05"W.

ADDITIONAL INFORMATION

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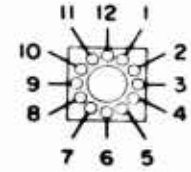

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS – MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
9	6				4	1	3			2			E-BRYS., SERIES OF WOOD PANELS. STUDY DATES: 21.2.63 TO 7.2.64 LOC.: LAT. 38°55'S; LONG. 58°42'W.
9	7	3				1	4		5	2	4		E-BRYS. WOOD PANEL DATA: 6.2.64 TO 10.5.66 LOC.: LAT. 47°46'S; LONG. 65°64'W.
9	8				1	2	4			3			E-BRYS., WOOD PANEL DATA: 8.12.63 TO ? LOC.: LAT. 36°18'S; LONG. 56°47'W.
9	A	6			2	5	3	1			4		MOLS. DOM. BY MUSS., THEN OYSTERS. OPTIMUM GROWING SEASON 12 TO 4.
9	B	6			2	T	4	1	8	5	3		MOLS. DOM. BY MUSS.
9	C	6			2	5	4	1	T		3		MOLS. DOM. BY MUSS.
9	D	6			2	T	5	1	8	3	4		MOLS. DOM. BY MUSS.
9	E				3	T	4	2	5	1	6		MOLS. DOM. BY MUSS. & OYSTERS. OPTIMUM GROWING SEASON 12 TO 4
10	A	T			1	3	4	2		5	6		MOLS. DOM. BY OYSTERS & MUSS.
10	B	6			2	5	3	1			4		MOLS. DOM. BY MUSS., THEN OYSTERS.
10	C	6			2	5	3	1			4		MOLS. DOM. BY MUSS, THEN OYSTERS.

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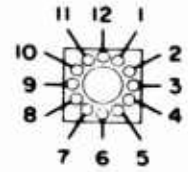

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
11	A	8			2	6	5		3	1	7		CORAL IS 4th IN REL AB.
11	B				2	5	6	1		3			MOLS DOM BY OYSTERS, THEN MUSS., THEN JINGLE-SHELLS. CORAL IS 4th IN REL. AB.
11	C	7			1	3	4	2		5	6		MOLS. DOM. BY MUSS., THEN OYSTERS.
12	1	6			1	3	5	4	7	2	8	LM	MOLS DOM. BY OYSTERS. OSTREA & JINGLE-SHELLS: ANOMIA. GREEN & BROWN ALG. E&F. BRYS, E-SPONGES, VERMETIDS (P), BRACHIOPODS (P), WOOD PANELS: 15.6.44 TO ?12.47. SITE: USN STATION.
12	2	7			1	4	3	5		2	6		SITE: FT. SHERMAN AREA.
12	3				4	1	2	5		3			MOLS DOM. BY OYSTERS, THEN CLAMS. OFFSHORE SITE AT 50 FT. DEPTH.
12	4				2	1	4			3			
13													NO DATA.
14	1	4	5		1	3	2	6			7	LM	ACORN BARNS., MOLS INCL. OYSTERS: OSTREA, MUSS.: MYTILUS, & JINGLE-SHELLS: ANOMIA. GREEN ALG. WOOD PANEL DATA: 16.8.44 TO ?12.47. SITE: USN SHIPYARD: HUNTER'S POINT.

1 - JAN
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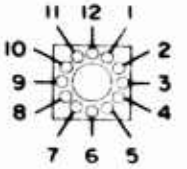

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
14	2	6	7		4	2	1	8		3	5	M	ACORN BARNS., E & F-BRYS., MOLS. INCL. MUSS.: MYTILUS & SCALLOPS: PECTIN, SERPULID TUBES. PANEL DATA DATES: 17.7.44 TO ?.12.47. SITE: USN STATION.
14	3	4	6		5	2	1	7		3	8	M	MOLS. INCL. MUSS.: MYTILUS, JINGLE-SHELLS: ANOMIA & SCALLOPS: PECTIN., ACORN BARNS., E & F- BRYS., GREEN ALG., SERPULID TUBES. PANEL DATA DATES: 15.6.44 TO ?.12.47. SITE: USN STATION.
14	4	P	P		P		P	P		P		M	ISOPODS (P)-(M.A.1-7), MOLS. INCL. MUSS.: MYTILUS. WOOD PANEL DATA DATES: ?.12.40 TO ?.12.42. SITE: OAKLAND ESTUARY.
14	5	9	8		5	1	6	3	4	2	7	M	PROTEOR (P)-(M.A.1-10), GREEN ALG., E & F- BRYS., RED & BROWN ALG., ACORN BARNS. WOOD PANEL DATA: 1.10.66 TO 1.10.67. ECHINUS (P)-(M.A.1-9). SITE: LONG HARBOR AREA.
14	6				1	3	2	4				M	ACORN BARNS., E-BRYS., MOLS. INCL. MUSS.: MYTILUS.
14	7				1		2	3				M	MOLS. INCL. MUSS.: MYTILUS, ACORN BARNS.
14	8	3			1		2	4				M	GREEN ALG., ACORN BARNS., MOLS. INCL. MUSS.: MYTILUS.
14	9	3			1	5	2	4					GREEN ALG., MOLS. DOM. BY MUSS.: MYTILUS, F-BRYS., ACORN BARNS.
14	10		4		3	P		2		1	P		SEA-TOADS., AMPHIPODS (P), HYDROIDS (P)-(M.A.12-5), BRYS. INCL. BUGULA. WOOD PANEL DATA. SITE: HARBOR AREA.
14	11	6	7		3	2	1	5		4	8	MS	GREEN ALG., E & F-BRYS., MOLS. INCL. MUSS.: MYTILUS & MODIOLUS, JINGLE-SHELLS: ANOMIA, SCALLOPS: PECTIN. PANEL DATA DATES: 14.6.44 TO ?.12.47. SITE: TERMINAL ISLAND NAVAL SHIPYARD.
14	12	1			2	3	4						ALG. DOM. BY GREEN, THEN RED., E-BRYS.
14	13	5	6		1	4	2	3			7	LM	LIM FOULING, GREEN ALG., E & F-BRYS., MOLS. INCL. MUSS.: MYTILUS. PANEL DATA DATES: 20.6.44 TO ?.12.47. SITE: USN SHIPYARD.

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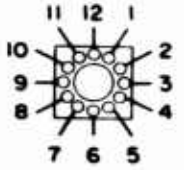
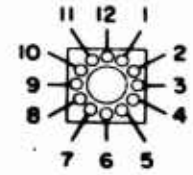


CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		1 – JAN, 2 – FEB, 3 – MAR, 4 – APR, 5 – MAY, 6 – JUN, 7 – JUL, 8 – AUG, 9 – SEP, 10 – OCT, 11 – NOV, 12 – DEC 
14	14				P	P	P	P					BUOY DATA.
14	15				4	1	3	5		2		M	ACORN BARNS., E&F-BRYS., MOLS. INCL. MUSS.: MYTILUS. SERPULID TUBES.
14	16				2	1	3	5		4		S	E&F-BRYS., ACORN BARNS., MOLS. INCL. MUSS.: MYTILUS. SERPULID TUBES.
14	17				1	2	3	4				MS	ACORN BARNS., E&F-BRYS., MOLS. INCL. MUSS.: MYTILUS. ISLAND ALSO KUSUMI AS YERBA BUENA. SAN FRANCISCO BAY AREA.
14	18	4	6		1	5	2	3				MS	E&F-BRYS., ISOPODS (P), MOLS. INCL. MUSS.: MYTILUS, GREEN ALG., WOOD PANEL DATA DATES: 3.1.45 TO 7.12.47. SITE: USN MAGAZINE, W. OF SUISUN BAY.
14	19	P	P		P	P	P	P	P	P	P		WOOD, CERAMIC & GLASS PANELS. STUDY DATES: 7.10.26 TO 7.10.35. SITE: SCRIPPS PIER.
14	20	P	P	P	3	P		1		2	P		SOL-TUNS., BRYS.: BUGULA, HYDROZOANS: OBELIA (P)- (M.A. 12-5), GREEN ALG., MOLS. INCL. MUSS.: MYTILUS (M.A. 3-5), CLAMS & LIMPETS. CHITONS (P). WOOD PANEL DATA. SITE: IN HARBOR AREA.
14	21				2			3		1			DATA FROM 8 STATIONS. STUDY DATES: 7.6.56 TO 7.8.59. SITE AT MOUTH OF SAN GABRIEL RIVER.
14	22							P					MOLS. INCL. MUSS. STUDY IN 1952. LOC: LAT. JAPAN, LONG. 118° 30'W.
14	23	P						P		P			SHELF STUDY., MOLS. INCL. CLAMS, NUDIS., & CHITONS. ECHINUS (P).
14	24	P						P		P			MOLS. INCL. NUDIS, CLAMS & CHITONS. ECHINUS (P). SHELF STUDY.
14	25	P						P		P			ECHINUS (P)., MOLS. INCL. CHITONS, NUDIS., & CLAMS. SHELF STUDY.

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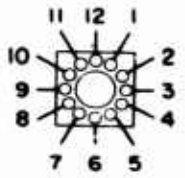
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		1 - JAN 7 - JUL 2 - FEB 8 - AUG 3 - MAR 9 - SEP 4 - APR 10 - OCT 5 - MAY 11 - NOV 6 - JUN 12 - DEC 
14	26	P						P		P			SHELF STUDY. ECHINS. (P), MOLS. INCL. NUDIS. (GASTS.), CLAMS (PELS.) & CHITONS.
15	1		2		3		1					M	ACORN BARNS., PANEL DATA DATES: 18.7.44 TO 12.2.46. SITE: USN STATION AT TONGUE POINT.
15	2				1		2	3				LM	ACORN BARNS., MOLS. DOM. BY MUSS.: MYTILUS.
15	3	4			2	3	1	6		5	7	LM	E&F-BRYS., GREEN ALG., ACORN BARNS., MOLS. INCL. MUSS.: MYTILUS, SERPULID TUBES. PANEL DATA DATES: 15.6.44 TO ?12.47.
15	4				1	3	2			4		L	E&F-BRYS., ACORN BARNS. WOOD PANEL DATA: 15.9.44 TO 19.3.46. SITE: TODD PACIFIC SHIPYARD.
15	5	7			2	3	1	5		4	6	LM	GREEN, RED & BROWN ALG., E&F-BRYS., MOLS. INCL. JINGLE-SHELLS: ANOMIA, & MUSS.: MYTILUS. PANEL DATA DATES: 15.7.44 TO ?12.47. SITE: ST. PAUL HARBOR, UGHNEY'S BAY.
15	6	4	6		5	2	1	7		3		TL	E&F-BRYS., RED, BROWN & GREEN ALG., MOLS. INCL. MUSS.: MYTILUS & JINGLE-SHELLS: ANOMIA. PANEL DATA DATES: 15.11.44 TO 16.8.46. SITE: HARBOR ISLAND, SITKA HARBOR.
15	7							P					MOLS. DOM. BY MUSS.
15	8	4			1	3	2	7		5	6	TL	LM FOULING. GREEN ALG., E&F-BRYS., MOLS. INCL. ANOMIA & MYTILUS. PANEL DATA DATES: 18.7.44 TO ?12.47. SITE: HADLOCK AREA, USN FACILITY.
15	9	5			2	3	1	4	8	6	7	LM	GREEN ALG., E&F-BRYS., MOLS. INCL. MUSS. MYTILUS. WOOD PANEL DATA DATES: 16.6.44 TO ?12.47. SITE: PUGET SOUND SHIPYARD, SINCLAIR INLET.
15	10			P				P					MOLS. INCL. MUSS. STUDY BEGUN IN 1952. LOC.: LAT. 51°03'N; LONG. 135°20'W.

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		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		
15	11			P	P	P	P	P	P	P			SILTY-SAND BOTTOM. ECHINS.(P). MOLS. INCL. CLAMS. LOC.: LAT. 56°30'N.; LONG. 153°30'W.
15	12				P			P					ECHINS.(P)., MOLS. INCL. CLAMS. LOC.: LAT. 58°N; LONG. 150°W.
15	13									P			GREY OOZE SEDIMENT. ECHINS.(P). SITE: LAT. 59°30'N; LONG. 145°30'W.
15	14				3	1				2			E&F-BRYS., TUBES ARE SPIRORBIS.
16	1				1	4	2	3					SITE: MASSACRE BAY AREA.
16	2				1		2						
16	3	4			3	1	2	6		5		L	M.A. PRED., GREEN & BROWN ALG., E&F-BRYS., MOLS. DOM. BY MUSS.: MYTILUS & MODIOLUS. WOOD PANEL DATA: 1.7.44 TO 1.8.47. SITE: N. SIDE OF UNALASKA IS.
16	4	3			2		1			4		TL	M.A. PRED. WOOD PANEL DATA: 15.7.44 TO ? 12.47. SITE: KUUK BAY AREA.
16	5	2			1	3	5	4					
16	6							P		P	P		BRACHIOPODS (P). LOC.: LAT. 55°15'N; LONG. 157°W.
16	7	P		P	P			P	P	P	P		SAND BOTTOM. INTENSITY & M.A. PRED. STUDY DATES: 1958 TO 1959. MOLS. INCL. GASTS. & PELS., ECHINS.(P).

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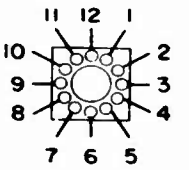


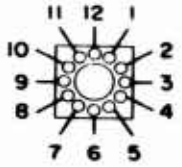
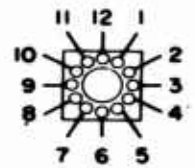
CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		1 - JAN 7 - JUL 2 - FEB 8 - AUG 3 - MAR 9 - SEP 4 - APR 10 - OCT 5 - MAY 11 - NOV 6 - JUN 12 - DEC 
16	8	P		P	P			P	P	P			STUDY-GRAVEL BOTTOM. STUDY DATES: 1958 TO 1969. INTENSITY & M.A. PRED. ECHNUS.(P). MOLS. INCL. GASTS. & MOSS.: MODIOLUS.
16	9	P	P	P	P			P	P		P		SAND BOTTOM. INTENSITY & M.A. PRED., STUDY DATES: 1958 TO 1969., MOLS. INCL. PELS. & GASTS., COL. TUNS.
16	10	P	P	P	P			P	P		P		SAND BOTTOM. STUDY FROM 1958 TO 1969. INTENSITY & M.A. PRED. MOLS. INCL. GASTS. & PELS. ECHNUS.(P), COL. TUNS.
16	11	P		P	P			P	P	P			SAND-MUD BOTTOM. INTENSITY & M.A. PRED. STUDY DATES: 1958 TO 1969. MOLS. INCL. PELS. & GASTS., ECHNUS.(P).
16	12	P		P	P			P	P	P	P		INTENSITY & M.A. PRED. STUDY DATES: 1958 TO 1969. MOLS. INCL. MOSS.: MODIOLUS, OTHER PELS. & ALSO GASTS. SCL. & COL. TUNS.
16	13	P	P		P	P	P	P	P	P	P		SAND BOTTOM. INTENSITY & M.A. PRED. STUDY DATES: 1958 TO 1969. MOLS. INCL. MOSS.: MYTILUS, OTHER PELS., ALSO GASTS. COL. TUNS., ECHNUS.(P), CORAL.(P).
16	14	P			P	P	P	P		P	P		INTENSITY & M.A. PRED. STUDY DATES: 1958 TO 1969. CORAL.(P), ECHNUS.(P), SCL. & COL. TUNS.
16	15	P			P			P	P	P	P		STUDY DATES: 1958 TO 1969, INTENSITY & M.A. PRED. MOLS. INCL. GASTS., ECHNUS.(P), CORALS.(P), COL. TUNS.
16	16	P			P		P	P			P		INTENSITY & M.A. PRED. STUDY FROM 1958 TO 1969. ECHNUS.(P)., SCL. TUNS., MOLS. GASTS. & PELS.
16	17	P			P		P	P		P	P		SCL. & COL. TUNS., M.A. & INTENSITY PRED. STUDY DATES: 1958 TO 1969, ECHNUS.(P). MOLS. INCL. PELS. & GASTS.
16	18	P			P			P			P		M.A. & INTENSITY PRED., STUDY DATES: 1958 TO 1969., SCL. TUNS., MOLS. INCL. PELS. ECHNUS.(P).
16	19	P			P		P	P	P		P		STUDY DATES: 1958 TO 1969. INTENSITY & M.A. PRED., MOLS. INCL. GASTS. & PELS. ECHNUS.(P), CORALS.(P), SCL. & COL. TUNS.

CHART NUMBER	LOCATION NUMBER	FOULING ORGANISMS — MONTH(S) OF MAXIMUM ATTACHMENT, RELATIVE ABUNDANCE, PRESENCE (P)										SILT COVER	ADDITIONAL INFORMATION
		ALGAE	AMPHIPODS	ANEMONES	BARNACLES	BRYOZOANS	HYDROIDS	MOLLUSCS	SPONGES	TUBEWORMS	TUNICATES		1 - JAN 7 - JUL 2 - FEB 8 - AUG 3 - MAR 9 - SEP 4 - APR 10 - OCT 5 - MAY 11 - NOV 6 - JUN 12 - DEC 
16	20	P		P	P			P	P		P		INTENSITY & M.A. PRED., STUDY DATES: 1958 TO 1969. ECHIUS. (P), CORALS (P), MOLS. INCL. GASTS. & PELS., SOL. & COL. TUNS.
16	21	P			P		P	P	P	P	P		SANDY BOTTOM. STUDY FROM 1958 TO 1969). M.A. & INTENSITY PRED, MOLS. INCL. MUSS.: MODIOLUS, OTHER PELS., & GASTS., ECHIUS (P), CORALS (P), ISOPODS (P).
16	A	P			P	P	P	P	P				PRED. INTENSITY.
16	B	P			P		P	P			P		M.A. & INTENSITY PRED., ALG. IS PROBABLY CORALLINE.
17	1	P	P	P	P	P	P	P	P	P	P		STUDY DATES: 1949 TO 1960. DREDGE & NET COLLECTION), ECHIUS. (P), SEA-URCHINS (P), E & F-BRNS., MOLS. INCL. GASTS & PELS., SOL & COL. TUNS., ISOPODS (P)., COL. HYDROIDS.
17	A				P	P	P	P	P	P			INTENSITY & M.A. PRED., MOLS. INCL. MUSS.: MYTILUS & MODIOLUS.

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INDICES

I. INDEX OF CHART COORDINATES

Map No.	Latitude	Latitude	Longitude	Longitude
1	59°N	69°N	27°W	10°W
2	58°30'N	70°N	56°W	33°W
3	51°N	68°N	58°W	98°W
4	42°30'N	55°N	50°W	75°W
5	31°N	42°30'N	64°W	82°30'W
6	15°N	31°N	76°30'W	98°30'W
7	5°N	26°30'N	58°W	76°30'W
8	7°N	34°S	23°30'W	60°W
9	34°S	57°30'N	52°W	79°W
10	15°S	34°S	65°W	85°W
11	5°N	15°S	70°W	94°W
12	5°N	15°N	76°30'W	93°30'W
13	15°N	31°N	98°30'W	120°W
14	31°N	46°N	112°30'W	127°30'W
15	46°N	62°N	122°W	155°W
16	50°N	66°N	167°E	155°W
17	66°N	72°N	155°W	175°E

II. CHART/COUNTRY INDEX

CHART 1.

Iceland

CHART 2.

Greenland

CHART 3.

Canada
- Labrador
- N. W. Terr.
- Ontario
- Quebec

CHART 4.

Canada
- Labrador
- New Brunswick
- Newfoundland
- Nova Scotia
- Quebec

United States of America
- Maine
- New Hampshire

CHART 5.

Bermuda
United States of America
- Connecticut
- Delaware
- Georgia
- Maryland
- New Jersey
- New York
- North Carolina
- Pennsylvania
- Rhode Island
- South Carolina
- Virginia

CHART 6.

Bahama Is.
British Honduras
Cuba
Guatemala
Honduras
Jamaica
Mexico
United States of America
- Alabama
- Florida
- Louisiana
- Texas

CHART 7.

Bahama Is.
Columbia
Cuba
Dominican Republic
Haiti
Jamaica
Lesser Antilles
Puerto Rico
Trinidad
Venezuela

CHART 8.

Brazil
British Guiana
French Guiana
Surinam

CHART 9.

Argentina
Chile
Falkland Is.
Uruguay

CHART 10.

Chile
Peru

CHART 11.

Ecuador
Galapagos Is.
Peru

CHART 12.

Columbia
Costa Rica
Guatemala
El Salvador
Nicaragua
Panama

CHART 13.

Mexico

CHART 14.

Mexico
United States of America
  California

CHART 15.

Canada
  British Columbia
  Yukon Terr.
United States of America
  Alaska
  Oregon
  Washington

CHART 16.

Union of Soviet Socialist Republics
United States of America
  Alaska

CHART 17.

Union of Soviet Socialist Republics
United States of America
  Alaska

III. COUNTRY/AREA INDEX

IV. NUMERICAL INDEX

CHART 1.

1. Reykjavik, Ice.
A. Iceland
B. Iceland

CHART 2.

1. Nanortalik, Grl.
2. Gronne Dal Hbr., Grl.
3. Kangamiut, Grl.
4. Amerdloq Fjord, Grl.
A. Greenland
B. Greenland
C. Greenland

CHART 3.

1. Killinek Is., N. W. Terr., Can.
2. Ungava Bay (S.W.), Can.
3. Nuyuk Hbr., Can.
A. Hudson Bay Area, Can.
B. Foxe Basin Area, Can.
C. Hudson Str. (S.), Can.
D. Labrador, Can.
E. Baffin Is. (E. Coast), Can.

CHART 4.

1. Southwest Hbr., Me., U. S.
2. Lubec, Me., U. S.
3. Rockland, Me., U. S.
4. Casco Bay, Me., U. S.
5. Portland, Me., U. S.
6. Portsmouth, N. H., U. S.
7. Penobscot Bay, Me., U. S.
8. Lomond, Newf., Can.
9. Corner Brook, Newf., Can.
10. St. Mary's Bay, Newf., Can.
11. St. George's, Newf., Can.
12. Argentia, Newf., Can.
13. Belle Isle Str., Can.
14. Lamoine, Me., U. S.
15. Bar Harbor, Me., U. S.
A. Newfoundland, Can.
B. Labrador, Can.

CHART 5.

1. Chesapeake City, Md., U. S.
2. Red Bank, N. J., U. S.
3. Sandy Hook, N. J., U. S.
4. Cape May, N. J., U. S.
5. Barnegat City, N. J., U. S.
6. Bayonne, N. J., U. S.
7. Woods Hole, Mass., U. S.
8. New London, Conn., U. S.
9. Newport, R. I., U. S.
10. Block Is., R. I., U. S.
11. Chatham, Mass., U. S.
12. New Bedford, Mass., U. S.
13. Quonset Point, R. I., U. S.
14. Providence, R. I., U. S.
15. Fall River, Mass., U. S.
16. Atlantic Beach, N. Y., U. S.
17. Brooklyn, N. Y., U. S.
18. Boston, Mass., U. S.
19. Lynn, Mass., U. S.
20. Hingham, Mass., U. S.
21. Bayshore, Long Is., N. Y., U. S.
22. Staten Is., N. Y., U. S.
23. Hampton Roads, Va., U. S.
24. Yorktown, Va., U. S.
25. Chesapeake Bay, U. S.
26. Portsmouth, Va., U. S.
27. Norfolk, Va., U. S.
28. Cape Charles, Va., U. S.
29. Lewes, Del., U. S.
30. Solomons, Md., U. S.
31. Baltimore, Md., U. S.
32. Annapolis, Md., U. S.
33. Lee Hall, Va., U. S.
34. Bulls Bay, S. C., U. S.
35. Southport, N. C., U. S.
36. Charleston, S. C., U. S.
37. Wilmington, N. C., U. S.
38. Ocracoke, N. C., U. S.
39. Morehead City, N. C., U. S.
40. Piney Point, Md., U. S.
41. Fisher's Is., N. Y., U. S.
42. Tomkins Cove, N. Y., U. S.
43. U.S.N. Op. Base, Berm., U. K.
44. Philadelphia, Pa., U. S.
45. Cockspur Is., Ga., U. S.

CHART 5. (Continued)

46. Beaufort, N. C., U. S.
47. Queentree Landing, Md., U. S.
48. Patuxent Bridge, Md., U. S.
49. Chalk Point, Md., U. S.
50. Eagle Hbr., Md., U. S.
51. Lower Marlboro, Md., U. S.

CHART 6.

1. Tampa, Fla., U. S.
2. St. Petersburg, Fla., U. S.
3. St. Andrews Bay, Fla., U. S.
4. Panama City, Fla., U. S.
5. Pensacola, Fla., U. S.
6. Mobile, Ala., U. S.
7. Key West, Fla., U. S.
8. Jacksonville, Fla., U. S.
9. Ft. Pierce, Fla., U. S.
10. Daytona Beach, Fla., U. S.
11. Biscayne Bay, Fla., U. S.
12. Sabine, Texas, U. S.
13. Port Isabel, Tex., U. S.
14. Gulfport, Miss., U. S.
15. Galveston, Tex., U. S.
16. Corpus Christi, Tex., U. S.
17. Tongue of the Ocean, Bah., U. K.
18. Andros Is., Bah., U. K.
19. Port Royal, Jam.
20. Mayport, Fla., U. S.
21. Ft. Lauderdale, Fla., U. S.
22. Barataria Pass, La., U. S.
23. Baffin Bay, Tex., U. S.
24. Laguna Madre (Upper), Tex., U. S.
25. Oyster Bay, Tex., U. S.
26. Freeport, Tex., U. S.
27. Caminada Pass, La., U. S.

CHART 7.

1. Fajardo, P. R., U. S.
2. San Juan, P. R., U. S.
3. Mona Is., P. R., U. S.
4. Ponce, P. R., U. S.
5. Trinidad, Braz.
6. Guantanamo Bay, Cuba
7. Vieques, P. R., U. S.
8. St. Thomas, Virgin Is., U. S.
9. Barbados, U. K.

CHART 8.

1. Maceio, Braz.
2. Fernando De Noronha Is., Braz.
3. Rocas, Atol das, Braz.
4. Sao Pedro e Sao Paulo, Penedos de, Braz.
5. Ponta de Corumbau, Braz.
6. Paranagua, Braz.
7. Cabo de Sao Tome, Braz.
8. Baia de Todos Os Santos, Braz.
9. Salvador Bahia, Braz.

CHART 9.

1. Maldonado, Uru.
2. Ushuaia, Arg.
3. Puerto Madryn, Arg.
4. Puerto Belgrano, Arg.
5. Necochea, Arg.
6. Quequen, Arg.
7. Quinta Is., Arg.
8. Cabo San Antonio, Arg.

A. Chile
B. Chile
C. Tierra del Fuego, Arg.
D. Falkland Is., U. K. and Arg.
E. Argentina

CHART 10.

A. Peru and Chile
B. Chile
C. Juan Fernandez Is., Chile

CHART 11.

A. Galapagos Is., Ecua.
B. Ecuador
C. Peru

CHART 12.

1. Balboa, Pan.
2. Coco Solo, Pan.
3. Cristobal, Pan.
4. Ft. Amador, Pan.

CHART 13.

NO DATA

CHART 14.

1. San Francisco, Calif., U. S.
2. San Diego, Calif., U. S.
3. Port Hueneme, Calif., U. S.
4. Oakland, Calif., U. S.
5. Monterey, Calif., U. S.
6. Mare Is., Calif., U. S.
7. Benicia, Calif., U. S.
8. Alameda, Calif., U. S.
9. Samoa, Calif., U. S.
10. Long Beach, Calif., U. S.
11. San Pedro, Calif., U. S.
12. Point Arena, Calif., U. S.
13. Vallejo, Calif., U. S.
14. San Pablo Bay, Calif., U. S.
15. South Balboa, Calif., U. S.
16. Terminal Is., Calif., U. S.
17. Treasure Is., Calif., U. S.
18. Port Chicago, Calif., U. S.
19. La Jolla, Calif., U. S.
20. Los Angeles, Calif., U. S.
21. Alamitos Bay, Calif., U. S.
22. Big Rock area, Calif., U. S.
23. Santa Barbara area, Calif., U. S.
24. Gaviota area, Calif., U. S.
25. Santa Monica Bay, Calif., U. S.
26. Point Conception area, Calif., U. S.

CHART 15.

1. Astoria, Ore., U. S.
2. Everett, Wash., U. S.
3. Seattle, Wash., U. S.
4. Tacoma, Wash., U. S.
5. Kodiak, Alas., U. S.
6. Sitka, Alas., U. S.
7. Haines, Alas., U. S.
8. Indian Is., Wash., U. S.
9. Bremerton, Wash., U. S.
10. Mt. Edgecumbe, Alas., U. S.
11. Trinity Is. (E.), G. of Alas.
12. G. of Alas. area
13. G. of Alas. area
14. Friday Hbr., Wash., U. S.

CHART 16.

1. Attu, Alas., U. S.
2. Cold Bay, Alas., U. S.
3. Dutch Hbr., Alas., U. S.
4. Adak Is., Alas., U. S.
5. St. Paul Hbr., Alas., U. S.
6. G. of Alas. area
7. Unimak Is. area, Alas., U. S.
8. Alas. Pen. area
9. Alas. Pen. area
10. Alas. Pen. area
11. Alas. Pen. area
12. Alas. Pen. area
13. Alas. Pen. area
14. Alas. Pen. area
15. Alas. Pen. area
16. Alas. Pen. area
17. Alas. Pen. area
18. Alas. Pen. area
19. Alas. Pen. area
20. Alas. Pen. area
21. Unimak Is. area, Alas., U. S.

A. U.S.S.R., Bering Sea Coast
B. Alaska, Bering Sea Coast

CHART 17.

1. Point Barrow, Alas., U. S.

A. Chukchi Sea area

V. ALPHABETICAL INDEX

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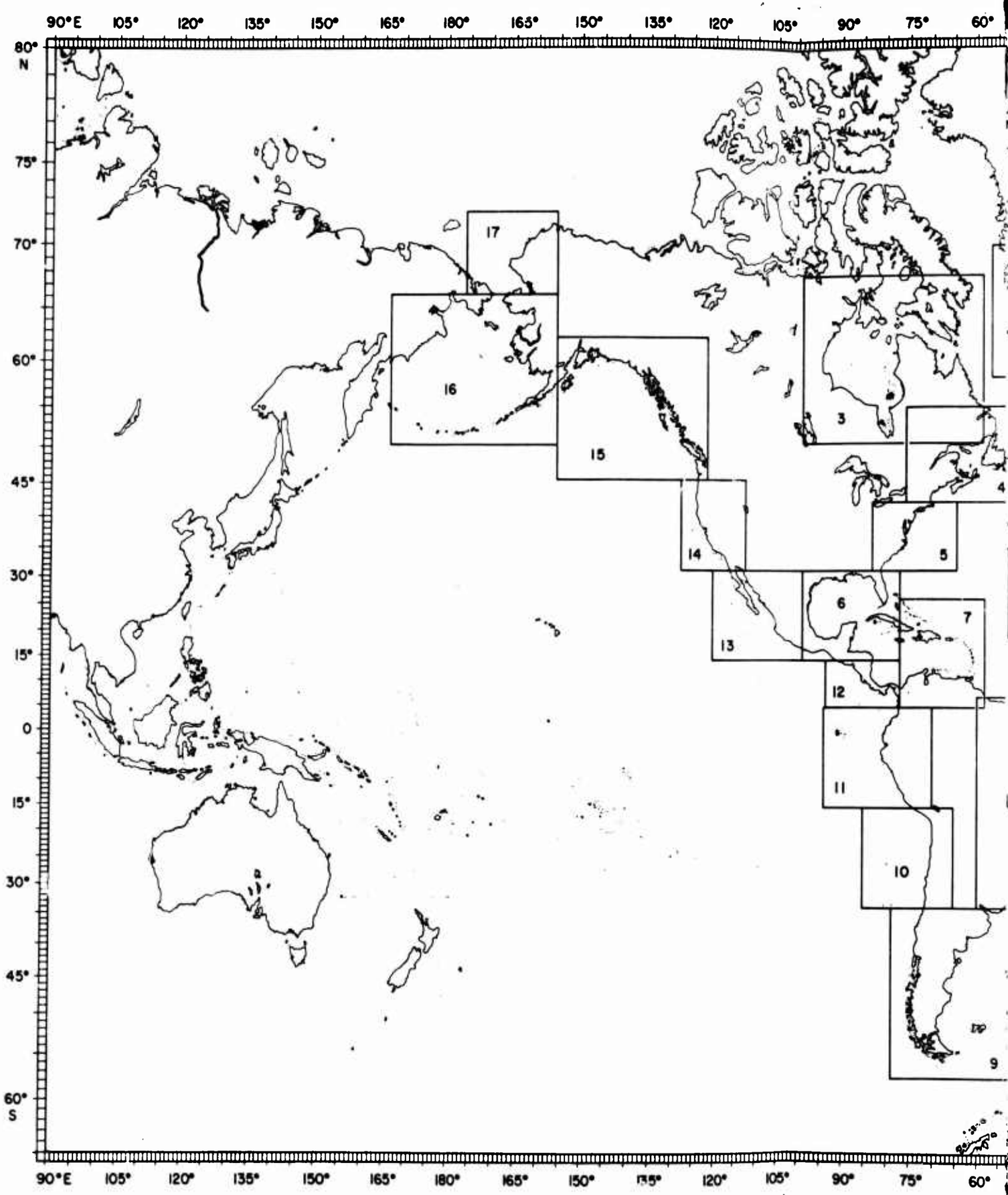

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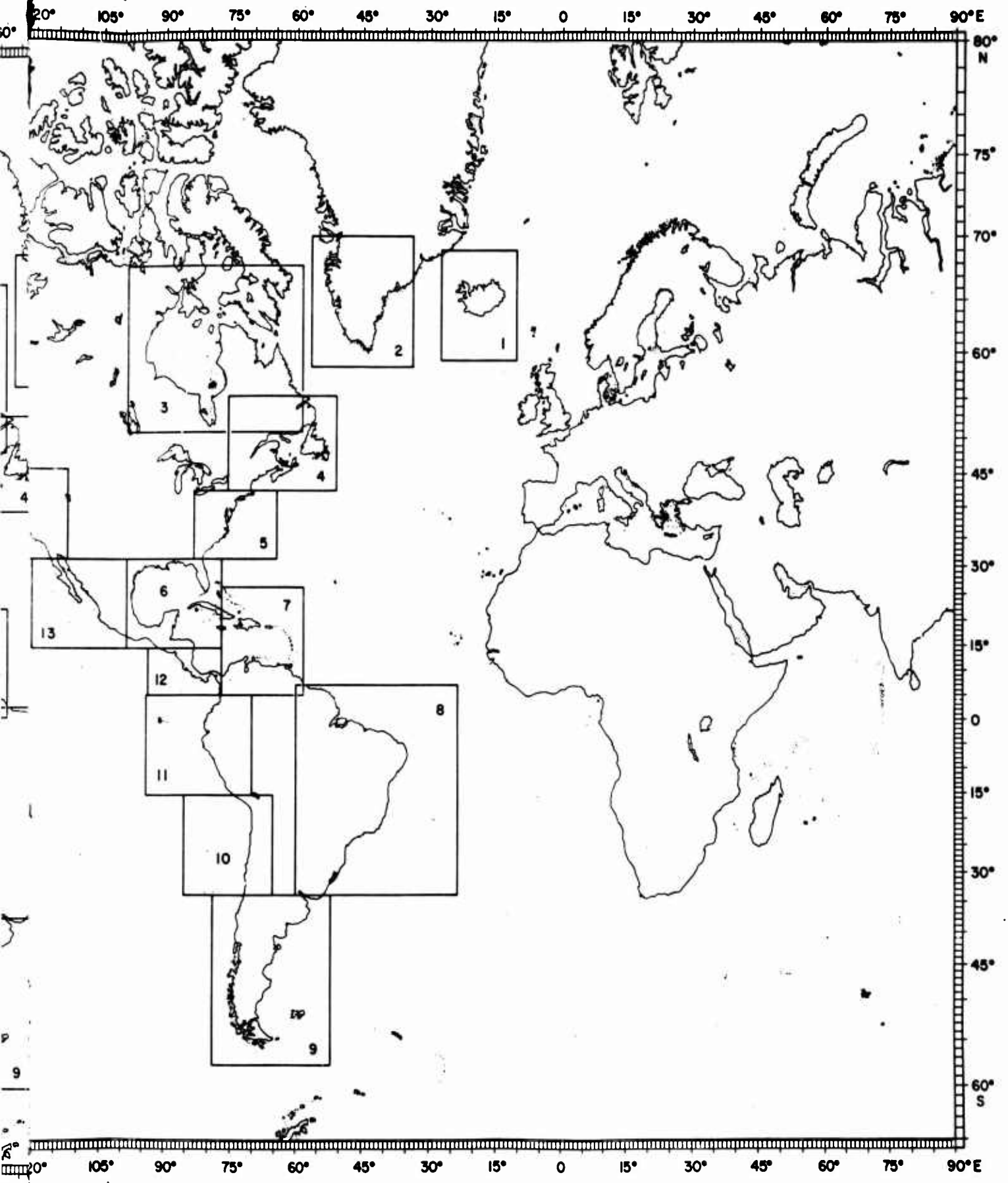
CHART 18 - WORLD REFERENCE CHART



ART 18 - WORLD REFERENCE CHART